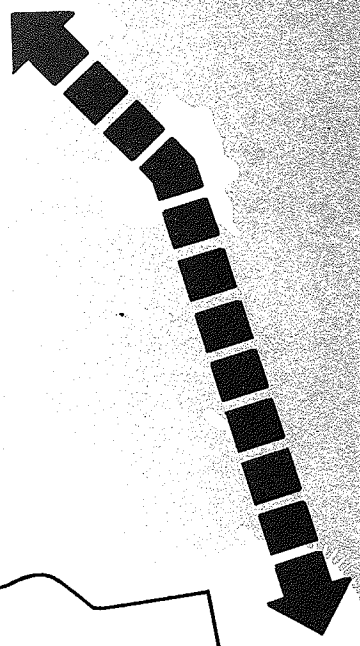
San Francisco Bay Crossings

San Francisco · Marin Crossing

PROGRESS REPORT



February 1962

DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS
DEPARTMENT OF PUBLIC WORKS · STATE OF CALIFORNIA

A

PROGRESS REPORT

TO

DEPARTMENT OF PUBLIC WORKS

ON A

SAN FRANCISCO-MARIN CROSSING

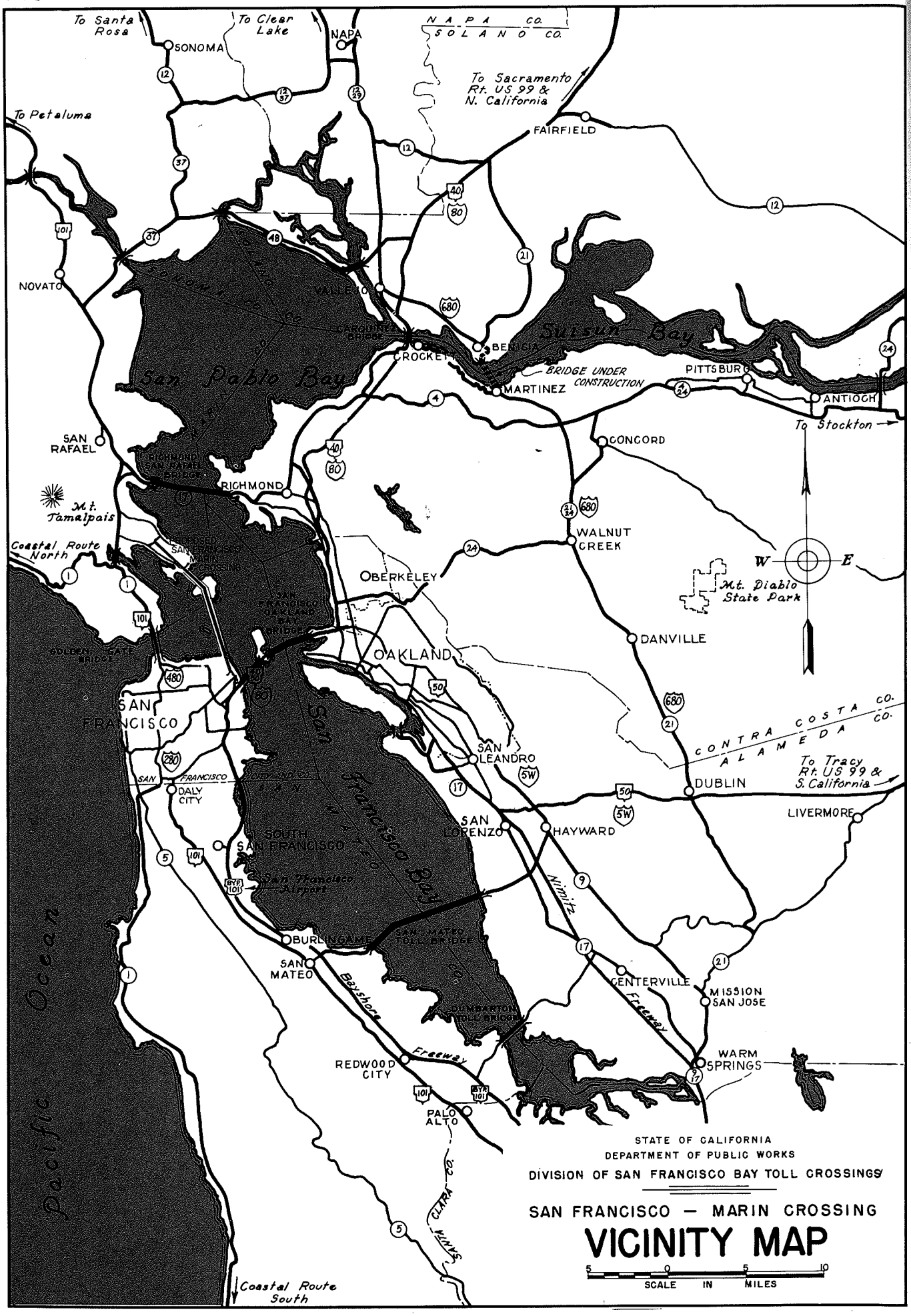
OF

SAN FRANCISCO BAY

February 1962

Division of San Francisco Bay Toll Crossings
Department of Public Works
State of California

FIG. I-1


To Santa Rosa
To Clear Lake
NAPA
SONOMA
NAPA CO.
SOLANO CO.
To Sacramento Rt. US 99 & N. California
To Petaluma
FAIRFIELD
NOVATO
VALLEJO
CARQUINEZ BRIDGE
CROCKETT
BENICIA
Suisun Bay
San Pablo Bay
BRIDGE UNDER CONSTRUCTION
MARTINEZ
PITTSBURG
ANTIOCH
To Stockton
CONCORD
SAN RAFAEL
RICHMOND SAN RAFAEL BRIDGE
RICHMOND
Mt. Tamalpais
WALNUT CREEK
Coastal Route North
PROPOSED SAN FRANCISCO-MARIN CROSSING
OBERKELEY
W
E
Mt. Diablo State Park
SAN FRANCISCO OAKLAND BAY BRIDGE
DANVILLE
GOLDEN GATE BRIDGE
OAKLAND
SAN FRANCISCO
CONTRA COSTA CO.
ALAMEDA CO.
SAN LEANDRO
To Tracy Rt. US 99 & S. California
DUBLIN
SAN FRANCISCO
DALY CITY
SAN LORENZO
HAYWARD
LIVERMORE
SOUTH SAN FRANCISCO
San Francisco Airport
San Francisco Bay
Nimitz Freeway
BURLINGAME
SAN MATEO TOLL BRIDGE
SAN MATEO
CENTERVILLE
MISSION SAN JOSE
Bayshore Freeway
DUMBARTON TOLL BRIDGE
REDWOOD CITY
WARM SPRINGS
PALO ALTO
SANTA CLARA
Pacific Ocean
Coastal Route South
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS
SAN FRANCISCO — MARIN CROSSING
VICINITY MAP
5 0 5 10
SCALE IN MILES

CHAPTER I

INTRODUCTION

AUTHORIZATION

The present studies by the Department of Public Works for a crossing between the City and County of San Francisco and Marin County was authorized during the 1961 Regular Session of the California Legislature when it enacted Senate Bill No. 1273. This Bill, signed by the Governor on July 19, 1961, and later codified as Chapter 2142, Statutes of 1961 appropriated the sum of $500,000 out of the State Highway Fund for the purpose of determining the feasibility of financing and constructing pursuant to the California Toll Bridge Authority Act a toll bridge, toll tube, or other toll highway crossing between the aforementioned counties. (See Appendix A.)

On August 15, 1961, the Director of Public Works issued a directive assigning the project study and investigation to the Division of San Francisco Bay Toll Crossings.

Work began on September 15, 1961, the date when Chapter 2142, Statutes of 1961 became effective and also the date when funds became available.

HISTORY

At the present time the only direct highway connection between San Francisco and Marin County is the Golden Gate Bridge. During the past decade, due to growth in the population of Marin County, vehicular traffic on this structure had increased to such a degree that it became evident the bridge would be congested in a few years. As a result Senate Bill No. 1984 (Chapter 1845, Statutes of 1955) was enacted to initiate studies for an additional crossing to Marin County. The investigation was conducted by the Division of San Francisco Bay Toll Crossings pursuant to a directive issued by the Director of Public Works on September 20, 1955. The results of that investigation were published in a "Preliminary Report to the Department of Public Works on a San Francisco-Tiburon Crossing of San Francisco Bay", dated January 1957.

Due to limited funds, $50,000, it was not possible to make a complete and thorough engineering investigation and cost estimate of the project. This earlier effort was confined to an examination of existing data and a paper study of the crossing. After considering all of the available information it was concluded that the best alignment for a crossing of San Francisco Bay would be as follows:

The terminus in the City of San Francisco should be located between Polk and Larkin Streets, then cross the Bay to the west side of Angel Island and across Raccoon Strait to Tiburon Peninsula. The northerly limits would be at Trestle Glen Drive. (See Figure No. IV-2)

The report of January 1957 made the following recommendation regarding the feasibility of financing and constructing a bridge between San Francisco and Marin County:

"In view of the rapid developments of the Bay Area and growth in vehicular traffic, it is recommended that additional funds in the amount of $500,000 be made available to complete the feasibility investigation of a San Francisco-Tiburon Crossing as described herein."

Chapter 2142, Statutes of 1961, follows that recommendation in the amount of funds made available but differs in crossing location from that previously reported upon in that the San Francisco Terminus is limited to the area bounded by Battery and Stockton Streets. Also, an alternate route via Alcatraz Island is required to be investigated.

SCOPE

This progress report consists of a description of the physical features of the proposed crossing and an outline of the studies and investigations to be made on foundation conditions, traffic and revenue, cost estimates, and financial feasibility. All of these studies will be completed next year so that their results can be presented in the final report due in February 1963.

CHAPTER II

SALT WATER BARRIERS

INTRODUCTION

As part of this report relating to the feasibility of a crossing between San Francisco and Marin County the statutes require that "the department shall also include in such investigation and study a review of all previous studies made by the state and federal governments of alternative routes for such a crossing on a salt water barrier connecting Marin County, Alameda County, and San Francisco, but no new studies shall be conducted as to such alternatives".

Numerous proposals have been made by private individuals as well as studies made on behalf of the State to construct barriers at various locations in San Francisco Bay to serve a multiplicity of purposes. The greatest benefit the proponents claimed that would result following construction of the barriers would be the conservation of fresh water draining into the Bay from the streams, rivers, and watershed areas. This fresh water would be impounded in lakes to be created behind the barriers. Other benefits to be realized were the prevention of salt water intrusion into the Delta region and the underground water storage areas and the reclamation of tidelands for industrial, residential, and other uses. Utilization of these barriers as a transportation facility was considered only as a secondary benefit.

The State of California has on three different occasions had investigations made on the problem of barriers in San Francisco Bay and its tributaries. The three authorized studies and their subsequent reports were:

1. In January 1951, John L. Savage, Consulting Engineer and the International Engineering Company, jointly submitted a "Report on Development of the San Francisco Bay Region" to the Fact-Finding Committee of the California Assembly on Tidelands Reclamation and Development, Related Traffic Problems and Relief of Congestion on Transbay Crossings.

2. The Water Project Authority in March 1955, pursuant to the Abshire-Kelly Salinity Control Barrier Act of 1953 (Chapter 1104, Statutes of 1953) submitted their findings to the California State Legislature on "Feasibility of Construction by the State of Barriers in the San Francisco Bay System".

3. In January 1960, the Weber Foundation Studies completed, pursuant to House Resolution 200, adopted by the Assembly on June 15, 1951, the report started by the Assembly Interim Committee on Conservation, Planning, and Public Works. This Committee was created by House Resolution 212 of the 1949 Regular Session of the Legislature. The report was titled "An Approach to a California Public Works Plan, Comprehensive Co-ordinated Public Works Planning and a Step-by-Step Water Plan for California".

Some of the more important studies and recommendations regarding salt water barriers in San Francisco Bay have been made by private individuals. Although the statutes do not specify that a report be made on these proposals it was thought desirable that they be included herein since they constitute the major contribution on this subject.

There has been one basic plan proposed for constructing barriers in San Francisco Bay and that is the one which has become known as the Reber Plan.

In 1946 a joint Army-Navy Board was appointed by the Secretaries of War and Navy pursuant to House Resolution 529, 79th Congress, Second Session, to investigate the need and feasibility, from the standpoint of national defense and the development of the peacetime economy, of constructing another crossing of San Francisco Bay or a system of dams across the Bays. During the public hearings held in the City of San Francisco on August 12-15, 1946, barrier locations were suggested by Messers. Nishkian, Dennison and Aston.

REVIEW OF BARRIER STUDIES

Reber Plan

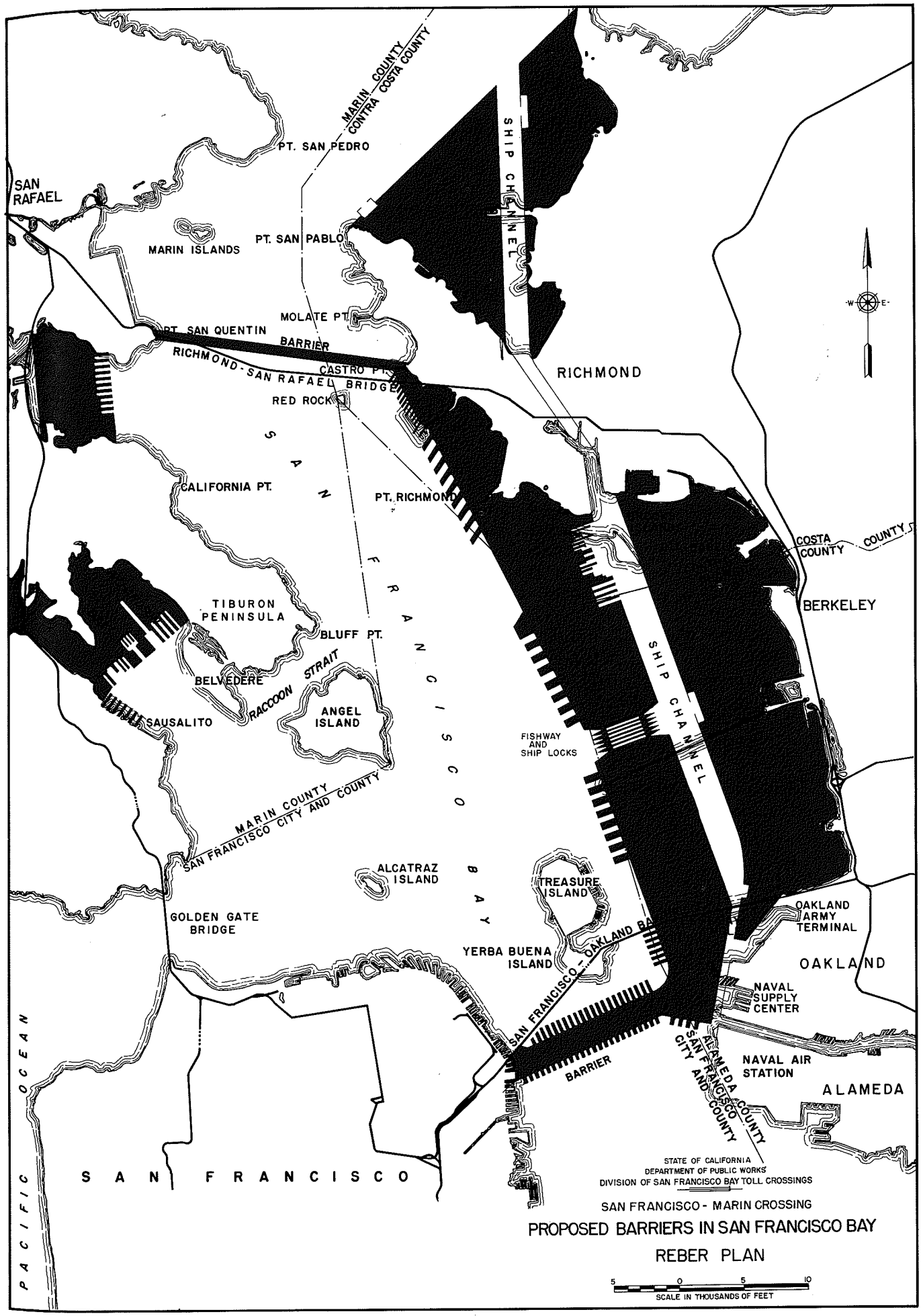
The first comprehensive plan for tideland reclamation and for constructing barriers in San Francisco Bay was proposed by Mr. John Reber in 1942. This plan, a diagram of which is shown on Figure No. II-1, would consist of four major elements: two earth and rock-fill barriers across San Francisco Bay, reclamation of the tidelands between the Bay Bridge and Richmond, and a ship channel constructed through the tidelands. Construction of the two barriers would seal off the northern and southern arms of San Francisco Bay thus transforming each into a fresh water lake which could only be reached via the ship channel.

The southernmost barrier 2,000 feet wide at the crest and four miles in length, would connect San Francisco and Alameda Counties with a San Francisco terminus south of the Bay Bridge. It would extend in a northeasterly direction to a point just opposite the Oakland Middle Harbor (now the Navy Supply Center) as a solid causeway for its entire length except for the 660-foot channel adjacent to the Oakland shore. The width of the barrier would be sufficient to provide space for a superhighway of six to eight 4-lane freeways as well as adequate room for main line railroad connections. Tubes would be provided beneath the narrowed ship channel opposite the Middle Harbor to permit highway and rail transportation to reach the barrier.

The northernmost barrier would extend from Castro Point in Contra Costa County to Point San Quentin in Marin County and would separate San Pablo Bay from San Francisco Bay. It would be 600 feet wide at the crest and approximately four miles in length and would act as a spillway for flood waters from the Sacramento River system. A reinforced concrete causeway could be constructed on top of the barrier to provide a roadbed for highway and railway traffic. It should be noted that the Richmond-San Rafael Bridge was built between the termini designated for this barrier.

A ship channel connecting the newly created fresh water lakes, San Pablo Bay and southern San Francisco Bay, would be dredged through the hydraulic fill placed parallel to the

FIG. II-1


MARIN COUNTY
CONTRA COSTA COUNTY
PT. SAN PEDRO
SAN RAFAEL
MARIN ISLANDS
PT. SAN PABLO
SHIP CHANNEL
MOLATE PT.
PT. SAN QUENTIN
BARRIER
RICHMOND-SAN RAFAEL BRIDGE
CASTRO PT.
RED ROCK
RICHMOND
CALIFORNIA PT.
PT. RICHMOND
SAN FRANCISCO BAY
COSTA COUNTY
BERKELEY
TIBURON PENINSULA
BLUFF PT.
BELVEDERE
RACCOON STRAIT
SAUSALITO
ANGEL ISLAND
SHIP CHANNEL
FISHWAY AND SHIP LOCKS
MARIN COUNTY
SAN FRANCISCO CITY AND COUNTY
ALCATRAZ ISLAND
TREASURE ISLAND
OAKLAND ARMY TERMINAL
GOLDEN GATE BRIDGE
YERBA BUENA ISLAND
SAN FRANCISCO - OAKLAND BA
OAKLAND
NAVAL SUPPLY CENTER
SAN FRANCISCO BARRIER
ALAMEDA CITY AND COUNTY
SAN FRANCISCO COUNTY
NAVAL AIR STATION
ALAMEDA
PACIFIC OCEAN
SAN FRANCISCO
W
E
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS
SAN FRANCISCO - MARIN CROSSING
PROPOSED BARRIERS IN SAN FRANCISCO BAY
REBER PLAN
5 0 5 10
SCALE IN THOUSANDS OF FEET

East Bay shoreline from the Bay Bridge to Richmond. Access to the channel from San Francisco Bay would be through ship locks built in the fill directly opposite the Golden Gate. The channel would be one-half mile wide in its main portion, 660 feet wide at its narrowest points, and have a depth of 50 feet below mean lower low water.

Although not a necessary part of the Reber Plan, as such, certain areas were designated as possible sites for additional tideland reclamation. These areas were located in Richardson Bay, the cove area south of Point San Quentin, and to the north of Richmond along the southerly shore of San Pablo Bay.

The Reber Plan was discussed extensively during the 1946 hearings of the Joint Army-Navy Board. The principal findings of this Board were:

1. It was not economically feasible.
2. It would not provide relief to transbay automobile traffic congestion.
3. It would misuse fresh water and would retard the full future economic development of Northern California.
4. It would disrupt existing industries along the Bay.
5. It would greatly increase the complexity and cost of the sewage and waste disposal problems throughout the areas bordering on the proposed lakes.

The Board concluded that the Reber Plan would result in the dislocation of industry, is economically infeasible, and is untenable from the standpoint of navigation and national defense.

The Consultants to the Assembly Committee also considered the Reber Plan and in their report concluded that

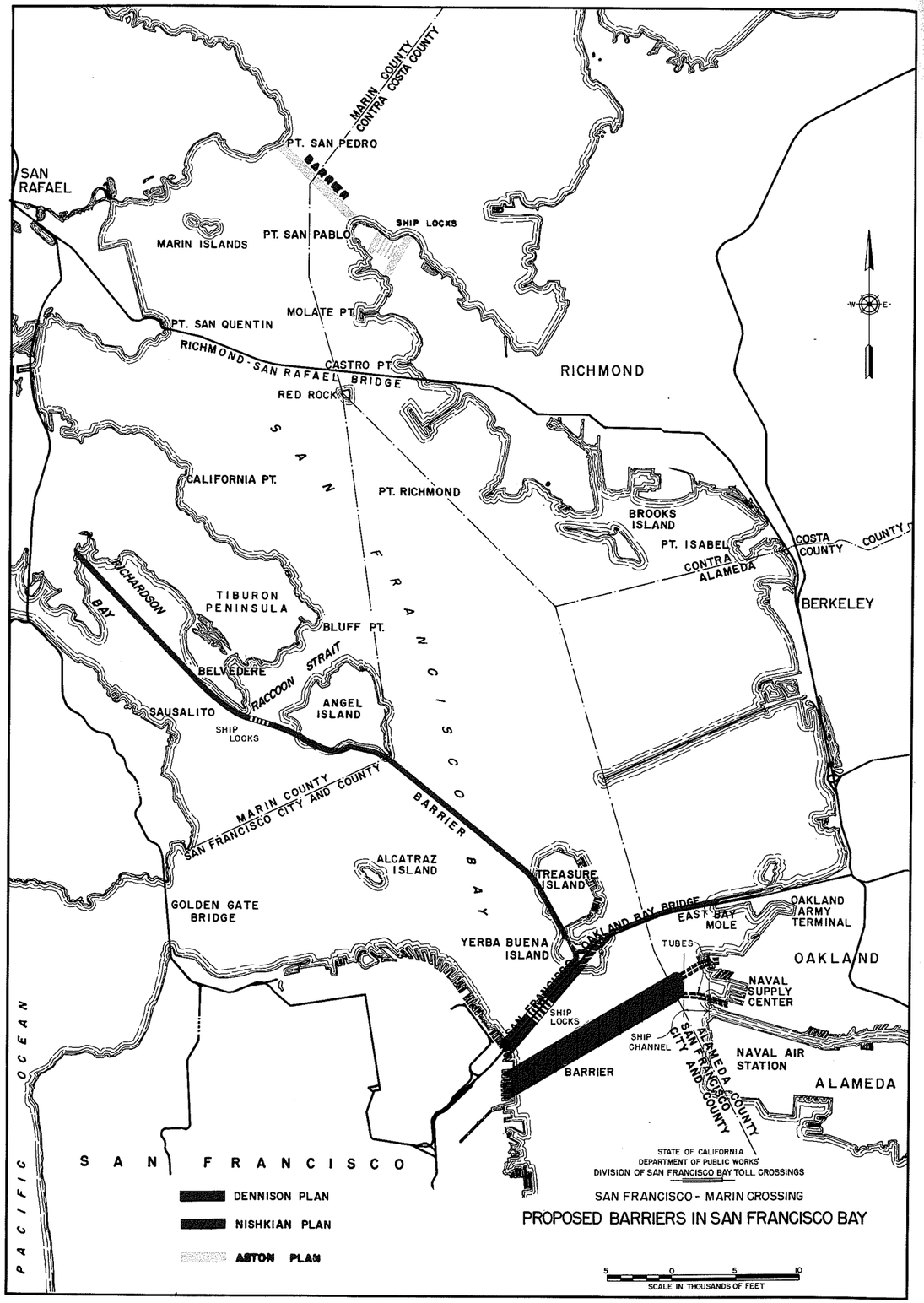
1. "The Reber Plan in its entirety is neither functionally nor economically feasible; that is, its realization would not produce the desired results, and would seriously hamper the national defense, and its costs would exceed the value of benefits."
2. "The Reber Plan in its entirety should be given no more consideration."
3. "A north barrier, a ship channel, and a south barrier as parts of the Reber Plan, taken individually merit no further consideration."

No estimate of costs was given when the Reber Plan was presented to the Joint Army-Navy Board. In 1955 the Division of Water Resources in its report to the Water Project Authority estimated that the Reber Plan would cost about $1,246,000,000 if it were constructed with conventional locks; if salt-flushing locks were used the cost would be $1,261,000,000. Not included in these estimates were the costs for highway, railway, wharves and other facilities, or the removal of and/or damages to existing improvements or developments which would be needed for rights of way.

Nishkian Plan

Mr. L. H. Nishkian collaborated on the Reber Plan and his plan shown on Figure No. II-2 was to construct only one portion of the Reber Plan, the south barrier. It was to be a solid fill, 2,000 feet wide and three miles long, on an axis between Townsend Street, San Francisco and the Oakland Mole. Instead of making the South Bay a fresh water lake, a 2,000-foot wide channel about 5,000 feet long would be constructed

FIG. II-2



on an approximate north-south line west of the Oakland Mole. The entrance to the Oakland Inner Harbor would be within the boundaries of this channel. As in the case of the Reber Plan, subaqueous tubes beneath the channel would be provided for rail and highway traffic.

The Joint Army-Navy Board concluded that this proposal would be infeasible for the following reasons:

1. The plan would result in silting the natural channels along the San Francisco waterfront due to the reduced tidal flow in front of the existing piers.

2. The velocity of the tidal flow in the channel would be increased substantially which would be undesirable from the viewpoint of navigation.

3. Shipping bound to the southern part of the Bay would be concentrated in one narrow channel.

4. A single channel would not be desirable from the standpoint of national defense.

Dennison Plan

The Sidney V. Dennison plan shown on Figure No. II-2 consisted of a barrier 1,200 feet wide beneath the present Bay Bridge from San Francisco to Yerba Buena Island with ship locks installed on each side of the center pier of the Bridge. A wye-tunnel would be built through the Island, one leg of which would lead to a barrier beneath the east end of the Bay Bridge, and the other to a barrier along the west side of Treasure Island to Tiburon Peninsula in Marin County via Angel Island and Raccoon Strait. Ship locks would be provided in Raccoon Strait along with highway and railroad facilities on each of

the barriers. All of the Bay beyond the barriers would become a fresh water lake.

The Joint Army-Navy Board concluded that since this plan would alter the physical characteristics of the Bay in order to accomplish the primary objective of relieving traffic congestion on the Bay Bridge the plan was not acceptable for the same reasons the Board gave for rejecting the Reber Plan.

Aston Plan

As shown on Figure No. II-2, the plan proposed by Mr. Taggart Aston would consist of a single salt water barrier in the northern portion of San Francisco Bay between Point San Pedro, Marin County, and Point San Pablo, Contra Costa County. A cut would be made through a hill saddle in the vicinity of Point San Pablo to provide a ship channel and locks. The highway would be carried on a five percent grade on a viaduct over the channel, and railroads would be carried on a one percent grade to a lift bridge over the channel.

As in the case of the Dennison Plan, the Joint Army-Navy Board concluded that the Aston Plan altered the physical characteristics of the Bay and was therefore not acceptable for the same reasons given for the Reber Plan.

Savage Plan

As previously described the wide barriers varying from 600 to 2,000 feet in width and extensive tideland reclamation were an essential part of the Reber Plan. The consultants to

the Fact-Finding Committee of the California Assembly on Tidelands Reclamation and Development, Related Traffic Problems and Relief of Congestion on Transbay Crossings were of the opinion that such broad features were not essential to provide a workable Reber Plan and therefore made extensive revisions to it. These revisions have become known as the Savage Plan and are delineated on Figure No. II-3. The principal features of this plan are presented in the following paragraphs.

The northern barrier would be constructed on a line between Bluff Point on Tiburon Peninsula to the navigation channel opposite Point Richmond. At the west end of this barrier a portion of Bluff Point would be removed to permit construction of a spillway with vertical lift gates to pass the maximum design flood of the Sacramento River system. At the opposite end two 2-lane tubes would be built beneath the channel to connect with the mainland. This barrier would be about 14,000 feet long and have a crest width of 110 feet which would be sufficient for eight 12-foot traffic lanes and a 14-foot median strip. There were to be no provisions for railroads.

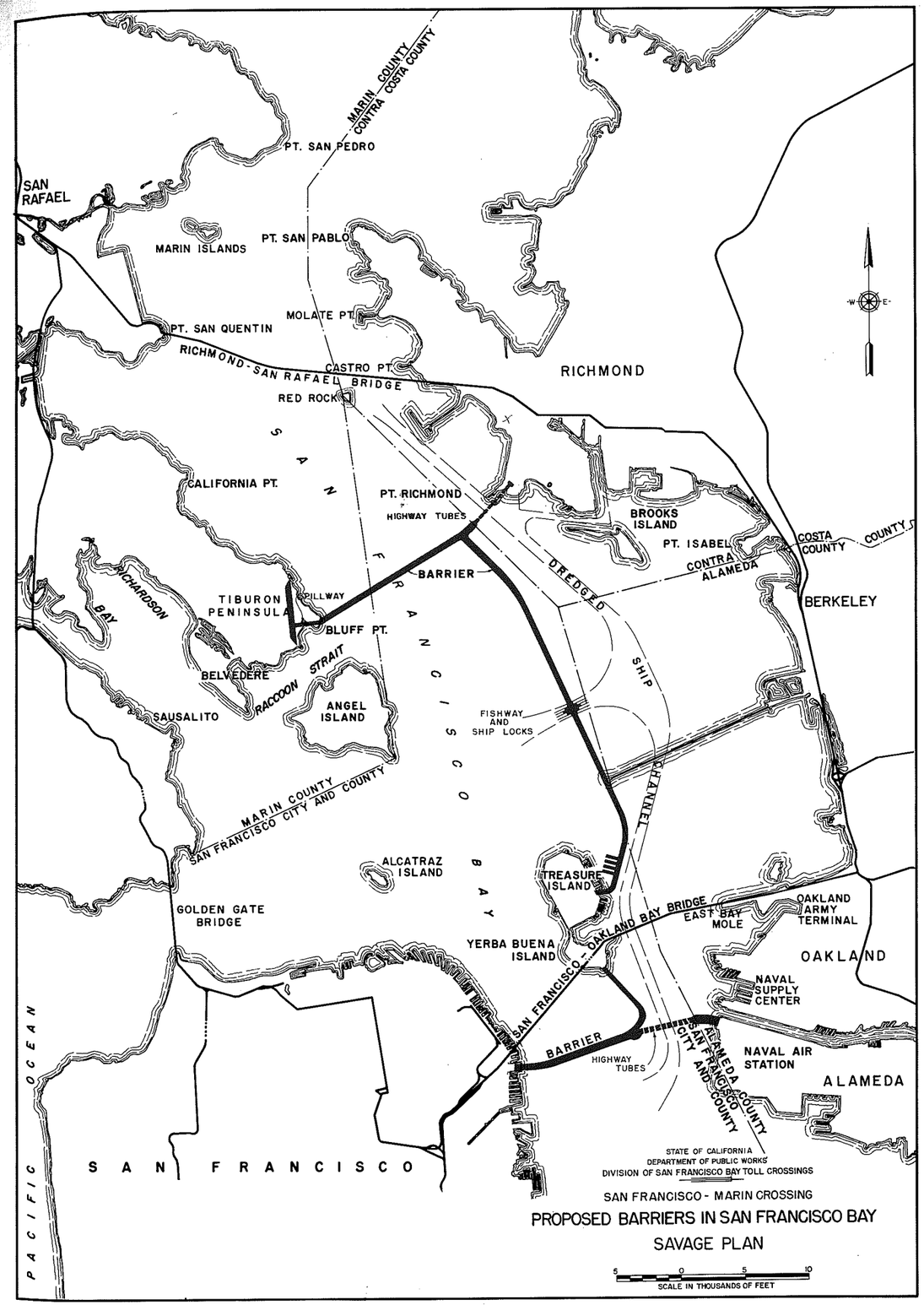
The south barrier would extend from the vicinity of Townsend and Brannan Streets, San Francisco, to a point opposite the Alameda Mole which is now the north boundary of the Alameda Naval Air Station, a distance of about 11,500 feet. Four 2-lane tubes would connect the barrier to the

Alameda Mole. To release salt water from the southern portion of San Francisco Bay sluice gates would be required. The crest width of 275 feet would provide sufficient space for fourteen 12-foot traffic lanes, two 10-foot parking lanes, two 6-foot median or planting areas, and a 75-foot lane for future railroad tracks.

A fresh water lake, that is, San Pablo Bay together with the southern part of San Francisco Bay, would be formed by a barrier parallel to the present shore line between the Bay Bridge toll plaza and Richmond. The first part of this barrier would extend from the east end of the north barrier to the southeasterly corner of Treasure Island. The second would start from the southeasterly corner of Yerba Buena Island and would connect with the east end of the southern barrier. A channel would be dredged behind this barrier to allow ships to reach the fresh water lake. Access to the channel from the main part of the Bay would be through a series of locks built in the barriers at a point opposite the Golden Gate.

This was estimated to cost about $415,546,000. The Division of Water Resources in its report of March 1955 to the Water Project Authority estimated the cost of the Savage Plan at $338,419,000 with conventional locks and $353,419,000 with salt-flushing locks.

FIG. II-3



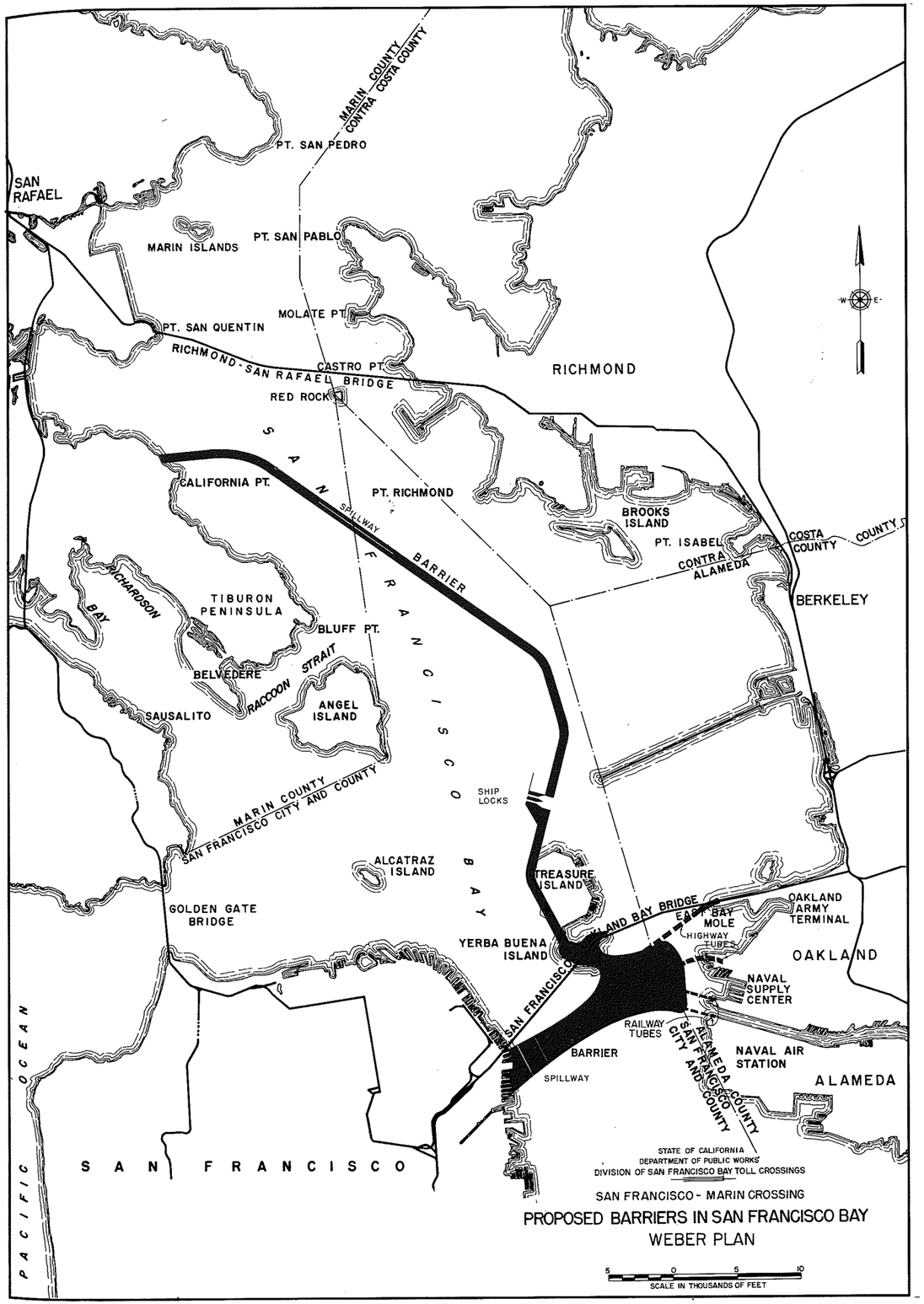
The Weber Foundation Studies

Plan shown on Figure No. II-4 is an adaptation of portions of the Savage and Nishkian Plans. It would consist of a barrier, having a crest width of 200 feet, commencing on the eastern shore of Tiburon Peninsula north of California Point and extend across the Bay in a general east-southeasterly direction to connect with Treasure Island and Yerba Buena Island on their western shorelines. A group of locks would be provided north of Treasure Island to permit ships to pass from the main portion of the Bay to the fresh water lake.

From Yerba Buena Island a barrier having a crest width of 600 feet would extend westward to the City of San Francisco on a modified Nishkian Plan to a point 2,000 feet offshore from the pierhead lines at either Piers 26-28 or Piers 30-32. This gap would be closed with a gated spillway weir containing locks for vessels of limited overhead clearance. Trestle structures would be used to gain access over this gap to permit highway and rail lines to reach San Francisco. At the eastern end of this barrier a transportation interchange center would be located from which transportation facilities would radiate in all directions. Subaqueous tubes would connect the East Bay with the Center.

The Weber Foundation Studies in its report of January 1960 estimated that this plan, including transportation facilities, would cost approximately $457,210,000.

FIG. II-4



CONCLUSIONS

This review of previous barrier studies requested by the enabling legislation and which could serve as a vehicular crossing between San Francisco and Marin County indicates that there is considerable doubt as to the feasibility of developing them as a method of conserving fresh water. Also, since their estimated construction costs are large, it would not be financially feasible to consider them for transportation purposes only. Therefore, the use of barriers will not receive further consideration as a crossing in this investigation.

C H A P T E R III

S E L E C T I O N O F C R O S S I N G T Y P E

The January 1957 Report presented a discussion on many factors which in a large measure determine the type of crossing to be selected for further study and investigation. Although Chapter 2142, Statutes of 1961, makes some changes in termini and alignment many of those factors or controls are applicable to this study.

CONTROLS

Statutory Controls

The statutes authorizing this investigation for an additional crossing between San Francisco and Marin Counties place certain restrictions upon the location, alignment, type of facility, and the kind of traffic to be accommodated.

1. The San Francisco terminus is to be located between Battery and Stockton Streets.
2. The crossing is to reach Marin County via Angel Island.
3. Alcatraz Island is to be considered as an alternate route to Angel Island and Marin County.
4. Various types of structures such as a bridge, tube, or other highway crossing are to be considered.

Physical Controls

The primary purpose of the crossing will be to serve both vehicular and rapid transit traffic. This purpose, influenced by site conditions, established certain physical criteria that need to be considered.

1. Freeway standards should be used in planning for vehicular traffic; that is, multiple-lane, divided or unidirectional roadways with traffic lane widths of not less than 12 feet.

2. Termini should fit into existing or proposed street, highway, and freeway systems; approaches, whenever possible, should connect directly with freeways to avoid further congestion of city streets.

3. Facilities for rapid transit system should be such that the users can be assured of comfortable, safe, and fast transportation across the Bay. Vehicular freeway standards are suitable for rapid transit.

4. Sufficient reserve capacity should be provided in the structure to handle traffic volumes that can be reasonably predicted for an extended period in the future.

5. Any crossing of navigable waters must consider the requirements of waterborne traffic.

6. Location of project facilities must take into consideration existing and future land use.

7. Structure type and arrangement should be consistent with foundation and topographic conditions existing at the site.

Economic Controls

Of special importance is the matter of financing. If the costs are in excess of reasonably expected revenues, the project cannot be undertaken. This requirement places an upper limit upon the facilities that could be initially provided.

STRUCTURE TYPE

Low Level Bridge or Barrier

A low level bridge or barrier may be eliminated from serious consideration at the statute location due to conflicts that would occur between waterborne and vehicular traffic. To place such an obstacle near the entrance to one of the major

inland waterways of the world would be unthinkable; such a structure would, in all probability, be vigorously opposed to by navigation interests and by the Federal Government as not being in the best interests of the national defense.

Chapter II of this report presented a review of previous salt water barriers proposed for San Francisco Bay. It was concluded that barriers as a transportation facility only, were not financially feasible. Thus, for the foregoing reasons no further consideration will be given to a low level bridge or a barrier for a crossing between San Francisco and Marin Counties.

Tube

The statutes require that an investigation and study be made on a subaqueous tube between San Francisco and Marin County. In general, the results of the previous study are applicable to this investigation and may be summarized as follows:

1. The irregular surface of the bay bottom would result in an undulating tube profile. Excavation depths would be as great as 70 feet at some points, while at others the tube would be almost entirely above existing ground. Deep excavations would be difficult and costly. Where the structure projects above the existing bay bottom, large protective fills would be required to safeguard the tube against tidal currents and from damage by grounding or dragging of ship anchors or other heavy submerged objects.

2. The tube crossing between San Francisco and Angel Island would be over four miles in length and a mile and one-half between Angel Island and Tiburon Peninsula. Ventilating a tube of this length, even under ideal conditions, would result in a high operating cost. Because of established shipping lanes, deep water, and difficult foundation conditions,

these buildings would be placed at approximately 6,000-foot centers along the main bay crossing. The buildings, thus located, would be in open bay water and, even though clear of the established shipping lanes, they must be protected by substantial fender systems.

3. It would be difficult to adhere to reasonable standards in making connections to the existing and proposed freeways. Similarly, connections on Angel Island and Tiburon Peninsula would be difficult. A sufficient length of open roadway is not attainable on Angel Island to accommodate toll plaza facilities or connections to the Island's roadway system.

4. After considering the dissimilarities of the proposed tube crossing with others where detailed estimates have been made, it is estimated that such a structure would cost between two to three times as much as a high-level bridge of the same capacity.

Because of the greater cost, together with its many inherent disadvantages, it is believed that further consideration of an underwater crossing between San Francisco and Tiburon Peninsula is not justified.

High-level Bridge

A high-level suspension bridge is ideally suited to the location of this crossing and to the general controls previously enumerated. The deep navigable waters with shipping lanes spread over a wide area, shown on Figure III-1, dictate the use of long spans and high vertical clearances comparable to those provided by other bridges within the immediate vicinity. The high rocky bluffs of the adjacent shores present ideal natural conditions for approaches and anchorages required for suspension bridges.

Thus, only a high-level suspension bridge will be considered for detailed investigations.

FIG. III-1

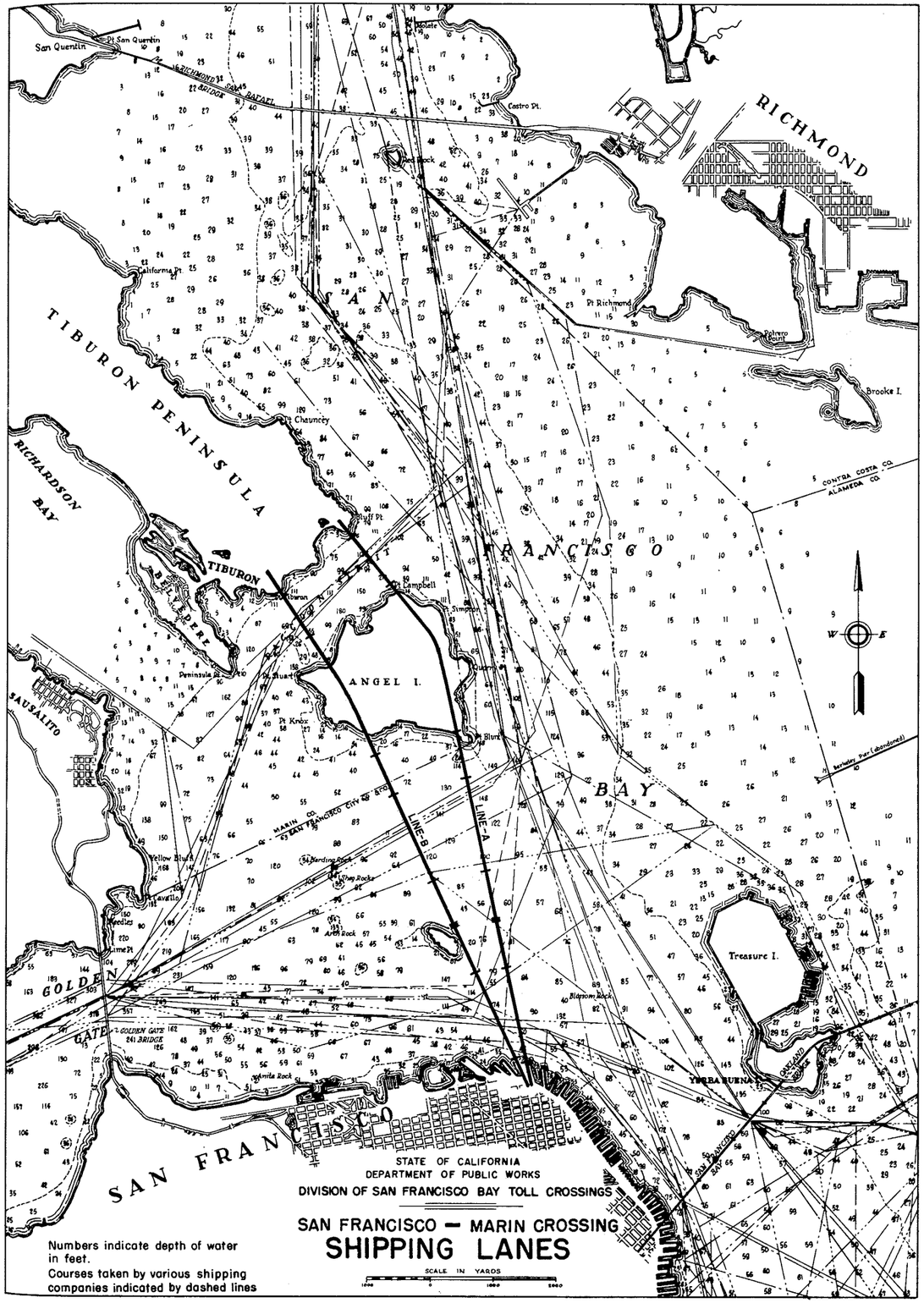
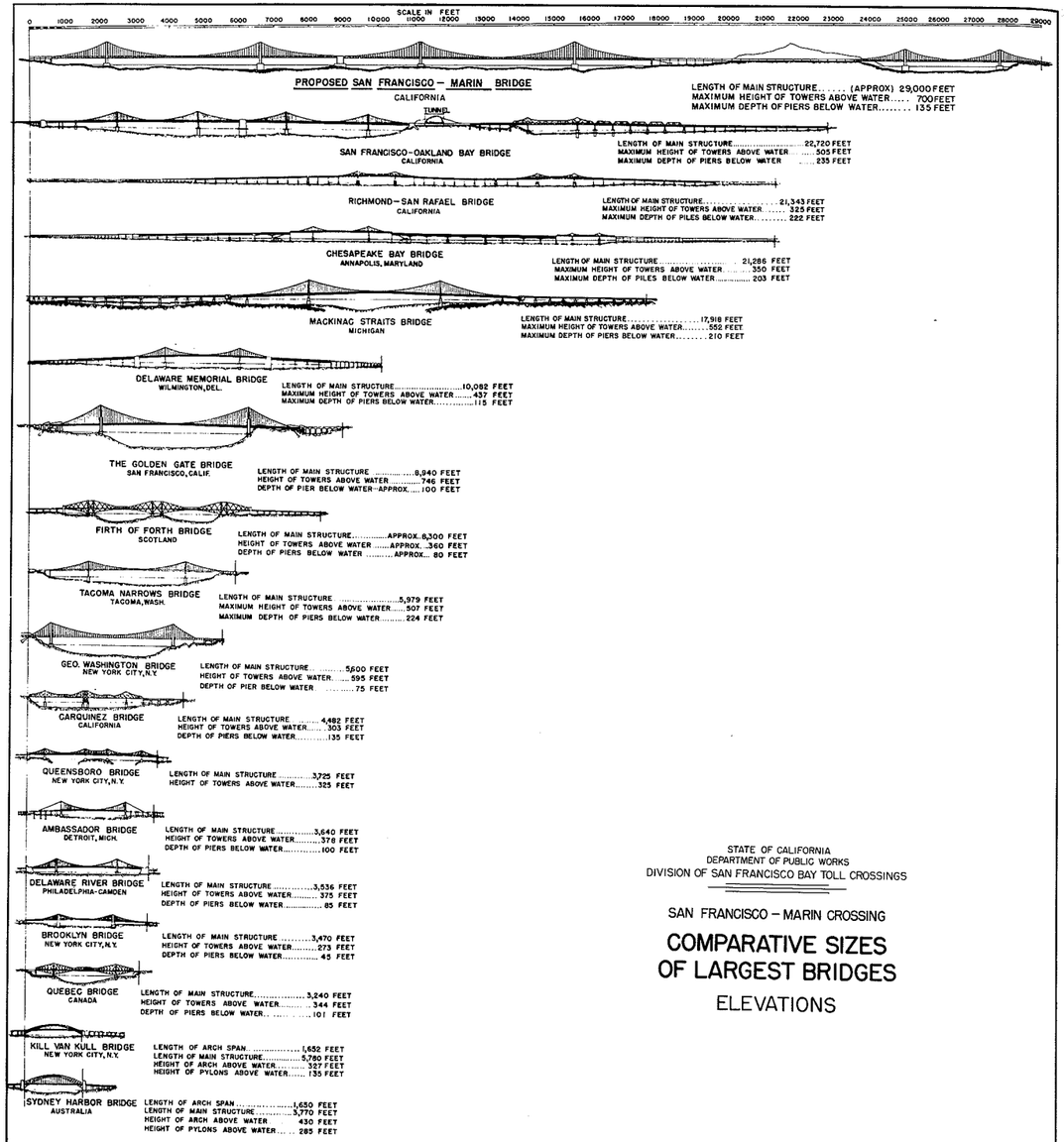


FIG. IV-1



CHAPTER IV

CROSSING STUDIES

GENERAL

The proposed crossing would be the longest high-level bridge in the world and its construction would rank as one of the major engineering and construction accomplishments in modern times. From the cable anchorage in San Francisco to that on Tiburon Peninsula the crossing would have a length of over five miles. The total length of the project including approaches, would be more than nine miles. Comparative dimensions of a proposed San Francisco-Marin Crossing with some of the larger bridges in the world are shown on Figure No. IV-1.

A number of different alignments for the approaches and the overwater crossing were considered and it was concluded that only two routes merit more detailed study. These are shown on Figure No. IV-2.

Line A has its San Francisco terminus at Telegraph Hill and crosses San Francisco Bay to land on Angel Island in the vicinity of Blunt Point. It traverses the eastern side of the Island and crosses Raccoon Strait to Bluff Point on Tiburon Peninsula.

Line B also has its San Francisco terminus at Telegraph Hill and crosses the Bay just to the east of Alcatraz Island to land on the southerly shore of Angel Island. The line

traverses the westerly side of the Island and crosses Raccoon Strait to Point Tiburon on Tiburon Peninsula.

SAN FRANCISCO APPROACHES

Telegraph Hill dominates almost the entire width between Stockton and Battery Streets in which the San Francisco terminus is to be located. The Hill effectively divides this part of the City into two different types of land uses, residential and commercial. The commercial activities are confined, in the main, to the flat land to the east and north of the Hill. Exclusive of the port facilities the principal businesses are light manufacturing and warehousing. The remaining Hill areas are residential.

The San Francisco Approaches for Line A are shown on Figure No. IV-3 and for Line B on Figure No. IV-4. Each has a direct connection to the Embarcadero Freeway which would be situated close to the eastern face of Telegraph Hill. This location for such a connection would decrease the amount of property required for right of way, would not interfere with any future developments in this particular area, and would not obscure any view from Telegraph Hill. A connection to the Embarcadero Freeway would provide traffic from this bridge the choice of two routes, either the Bayshore Freeway or the proposed southerly extension of the City or to San Mateo County and beyond. It also provides a direct connection to the San Francisco-Oakland

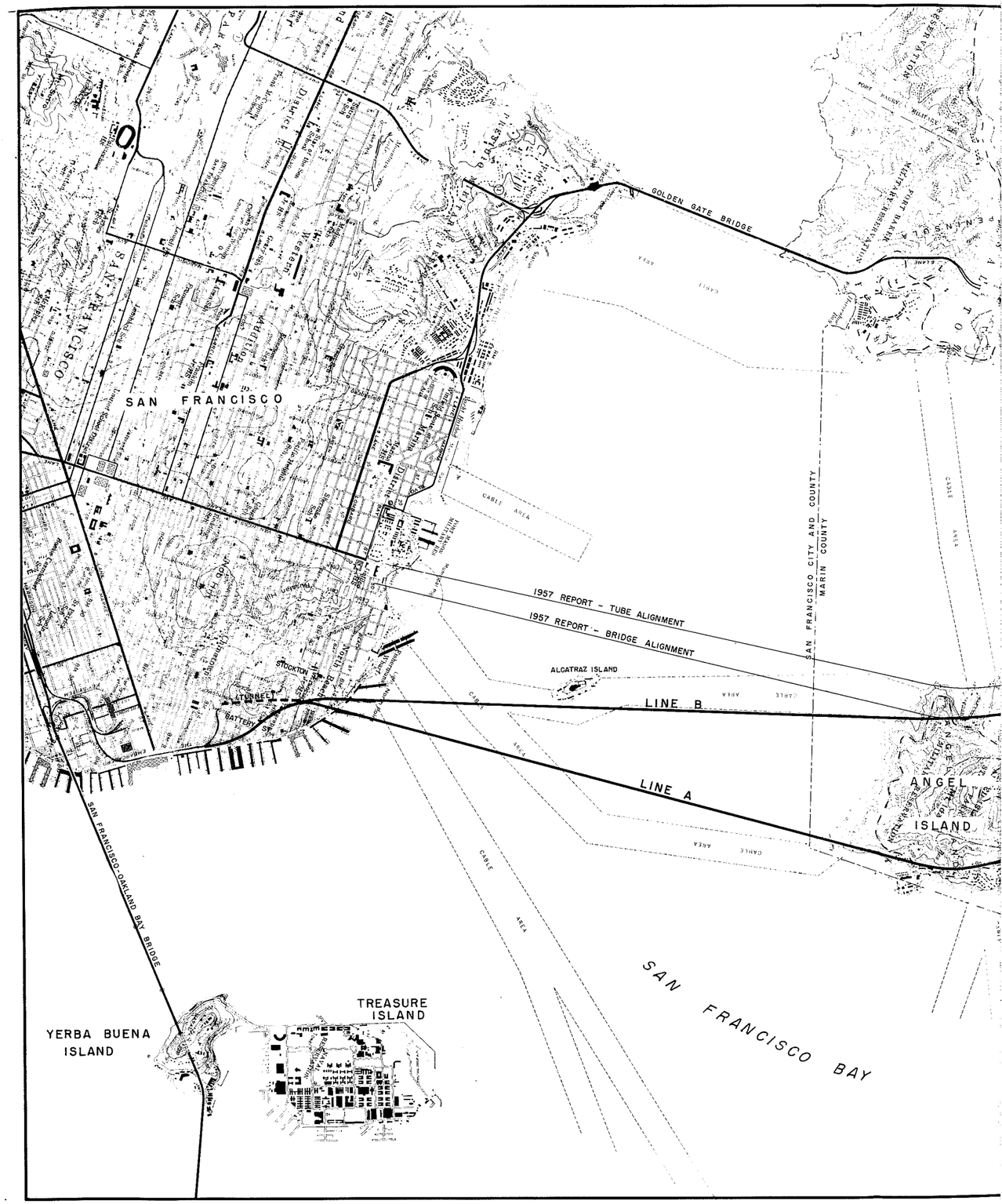


FIG. IV-2

SAN FRANCISCO

GOLDEN GATE BRIDGE

MARIN PENINSULA

RICHARDSON BAY

SAN FRANCISCO CITY AND COUNTY
MARIN COUNTY

1957 REPORT - TUBE ALIGNMENT

1957 REPORT - BRIDGE ALIGNMENT

ALCATRAZ ISLAND

LINE B

LINE A

BELVEDERE

TIBURON PENINSULA

PROPOSED CONSTRUCTION BY OTHERS

ANGEL ISLAND

SAN FRANCISCO-OAKLAND BAY BRIDGE

YERBA BUENA ISLAND

TREASURE ISLAND

SAN FRANCISCO BAY

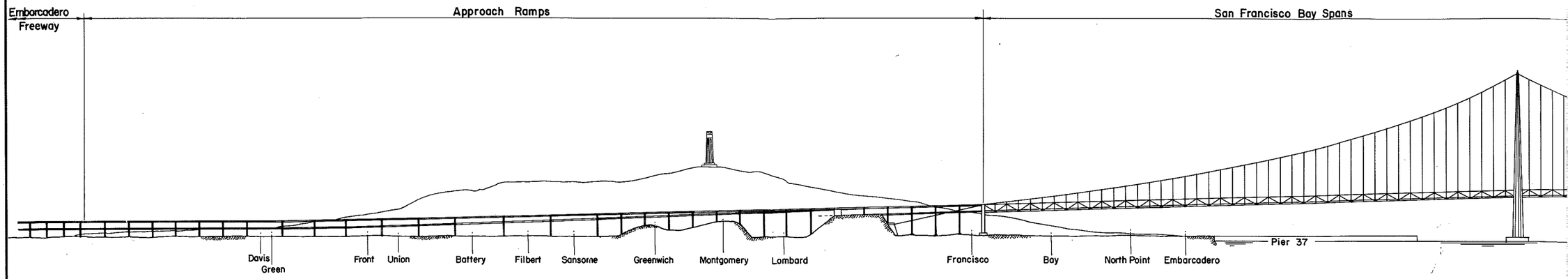
RICHMOND - SAN RAFAEL BRIDGE

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

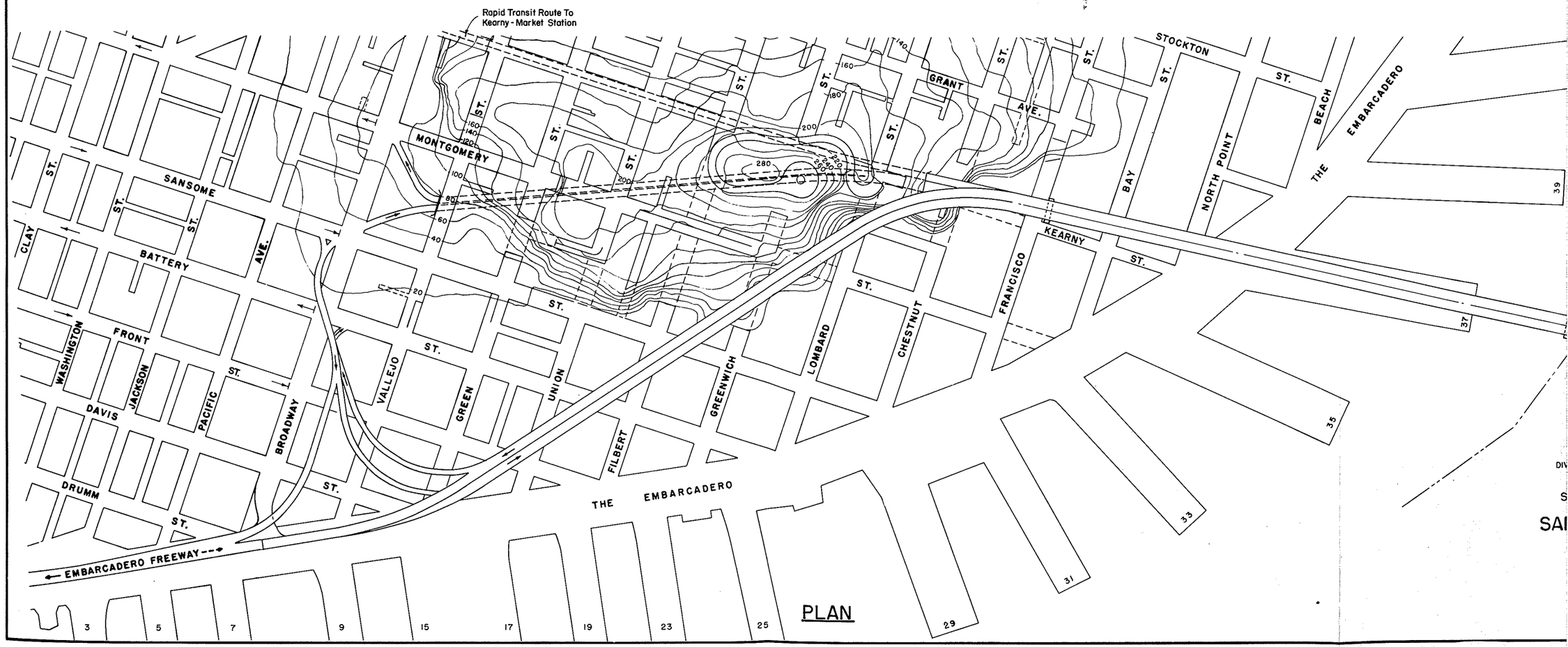
SAN FRANCISCO - MARIN CROSSING

LOCATION STUDIES

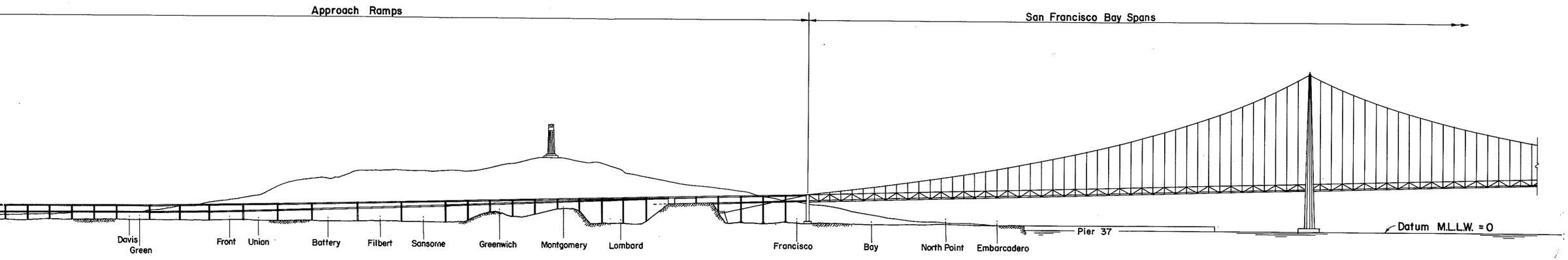
1000 0 1000 2000 3000 4000 5000
SCALE IN FEET



ELEVATION



PLAN



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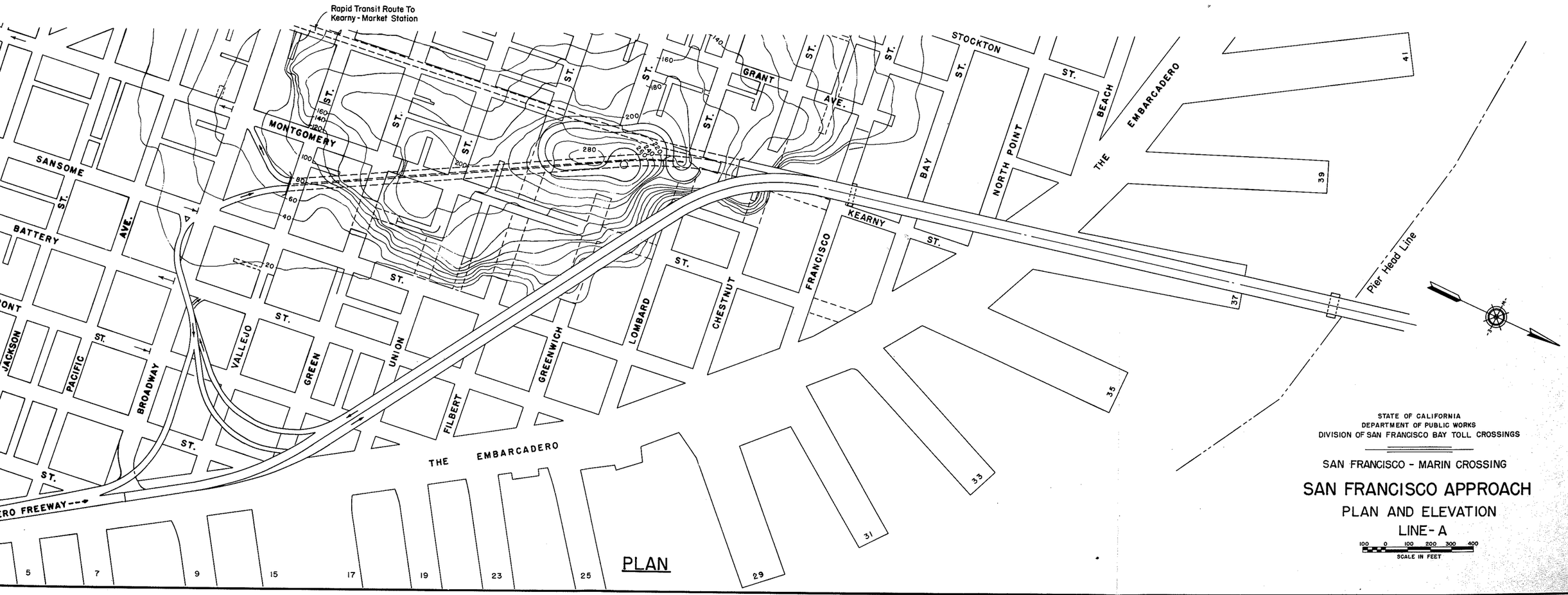


PLAN

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

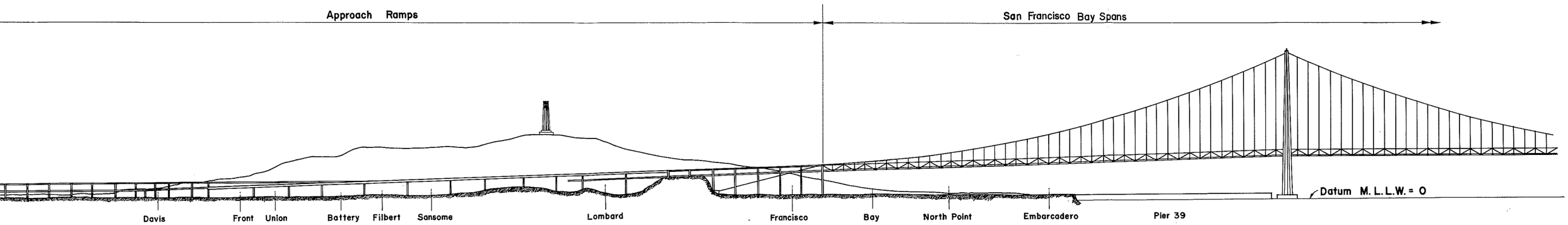
SAN FRANCISCO - MARIN CROSSING

SAN FRANCISCO APPROACH

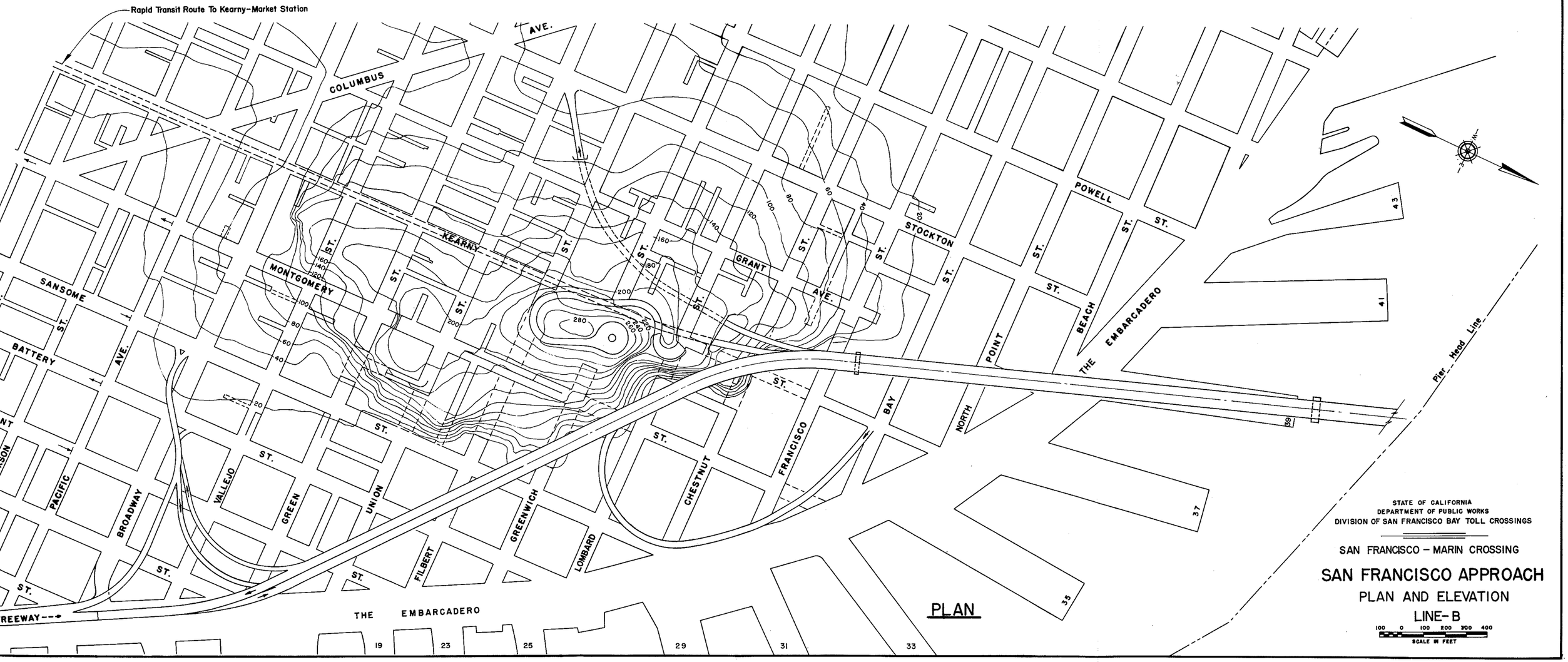
PLAN AND ELEVATION

LINE - A

100 0 100 200 300 400
SCALE IN FEET



ELEVATION



PLAN

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

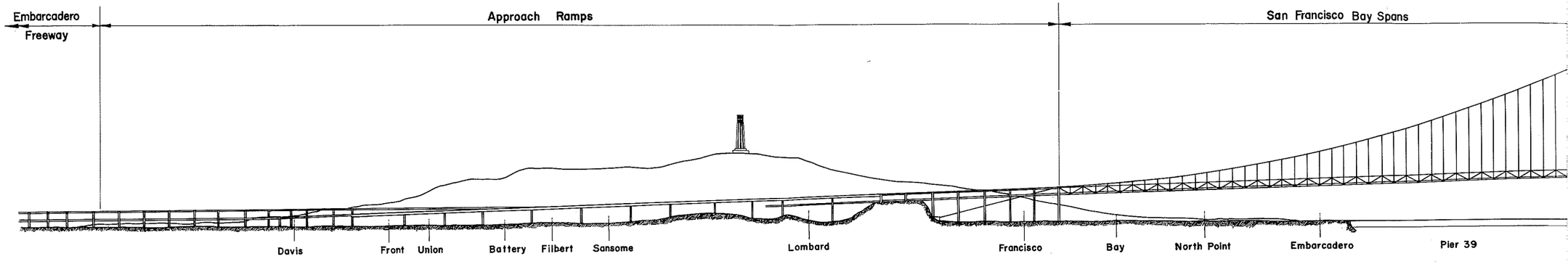
SAN FRANCISCO – MARIN CROSSING

SAN FRANCISCO APPROACH

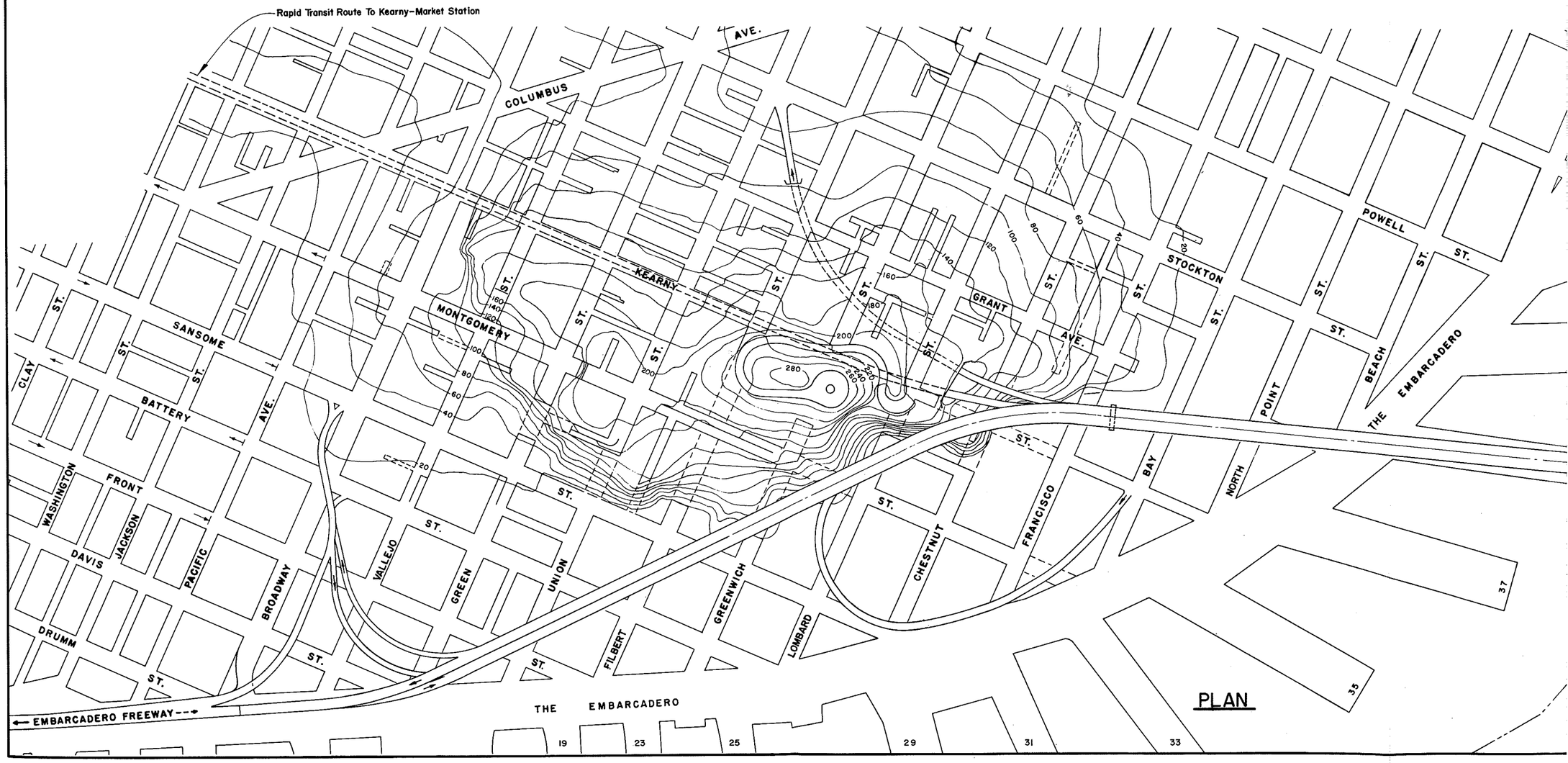
PLAN AND ELEVATION

LINE-B

100 0 100 200 300 400
SCALE IN FEET



ELEVATION



PLAN

Bay Bridge. For local movements, on- and off-ramps would be provided to connect with the present Embarcadero Freeway at Broadway. Thus, this local traffic will be able to enter the bridge at Broadway and Sansome Streets and leave the structure at Broadway and Battery Streets.

For future lower deck vehicular traffic on Line A a tunnel beneath Telegraph Hill would be provided with an off-ramp at Broadway and Montgomery Streets and an on-ramp at Broadway and Sansome Streets. For Line B a tunnel beneath Telegraph Hill would provide egress from the bridge at Stockton and Union Streets, and an on-ramp connection would be made from Bay Street. These lower deck ramps would be interchangeable with either Line A or Line B.

A route for a rapid transit line to the bridge could be accomplished by tunneling beneath Telegraph Hill and Kearny Street. This would in turn terminate at the Market-Montgomery-Kearny Station as proposed by the Bay Area Rapid Transit District.

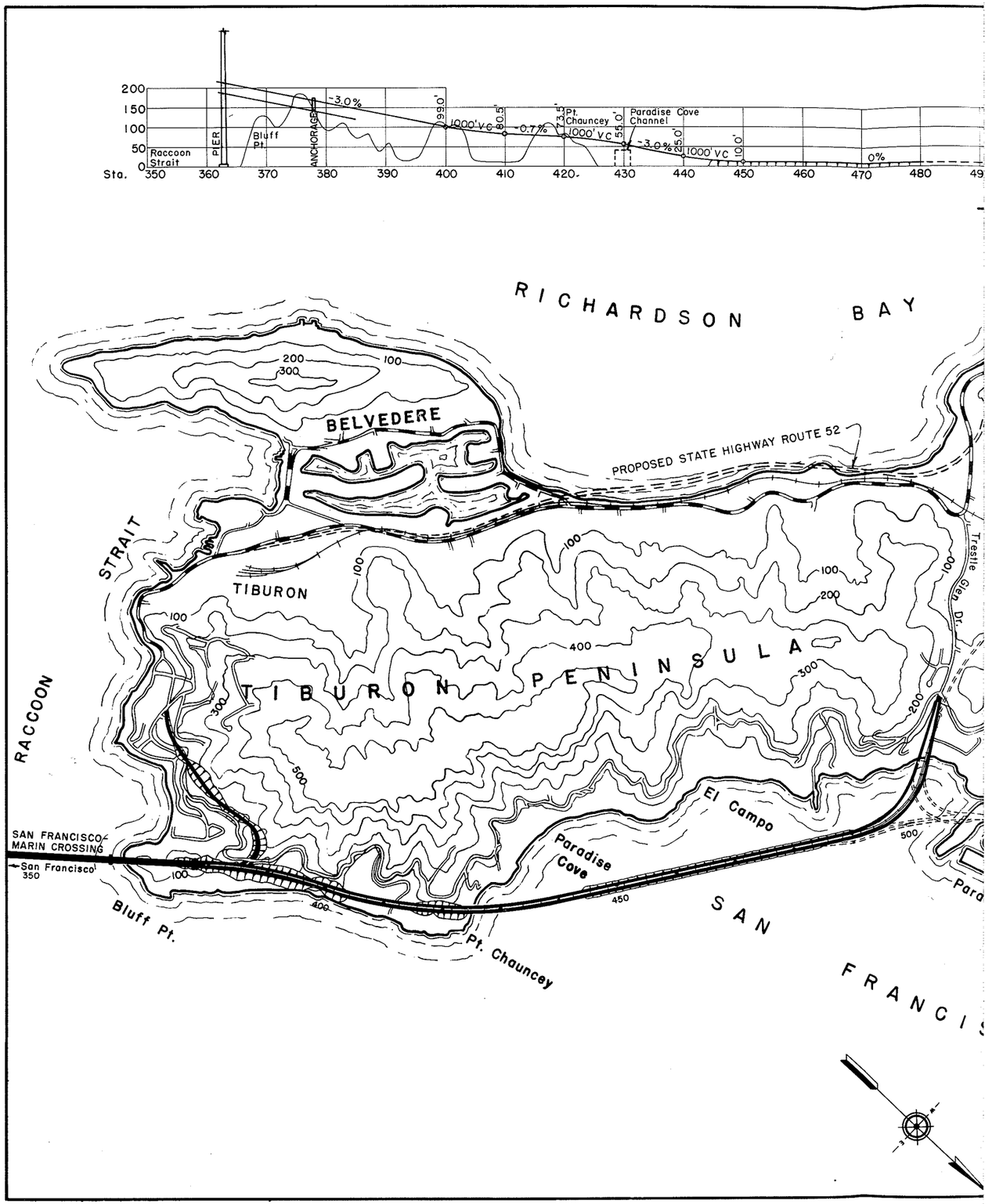
The San Francisco cable for both lines would be anchored into the precipitous face of Telegraph Hill and would not interfere with any land usage. Conversely a much larger structure than that on Beale Street for the San Francisco-Oakland Bay Bridge would be required because of the heavier cable loads and poor foundation conditions if the anchorage were constructed on the filled land between Telegraph Hill and the waterfront.

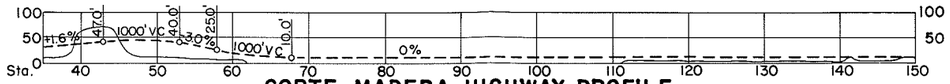
MARIN APPROACHES

The statute does not designate a specific Marin County terminus; however, any alignment which crosses Angel Island would logically terminate on Tiburon Peninsula which is a finger of land approximately two miles long and one mile wide jutting into San Francisco Bay from the southeastern corner of Marin County. The Peninsula's land mass rises almost directly from the Bay with the crest at about 600 feet above sea level. There are several peaks considerably higher than the crest. The eastern slope is very precipitous with poor foundation conditions while the western slope is gentler and is extensively developed as a residential area.

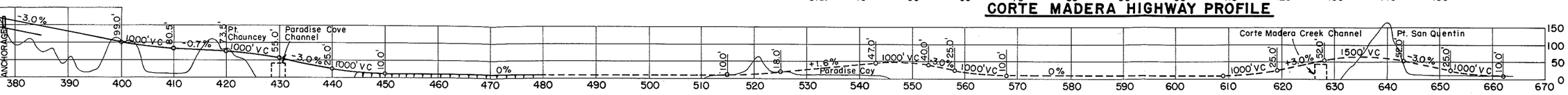
Due to the height required for the structure over Raccoon Strait, the topography, and the developments on the Peninsula, there are two locations suitable for the approaches; that is, along either side of the Peninsula.

The Marin Approach for Line A, shown on Figure No. IV-5, crosses the southeastern tip of Tiburon Peninsula between Bluff Point and Point Chauncey and thence on an offshore fill in San Francisco Bay to a connection with Trestle Glen Drive. This Drive ultimately joins State Highway Route 52 which in turn connects with U.S. 101 at the Alto Junction. A connection would also be made with the local streets in Tiburon at the southerly end of the Peninsula. A bridge having a minimum vertical clearance of 40 feet would be constructed north of Point Chauncey which would permit small boats to use the

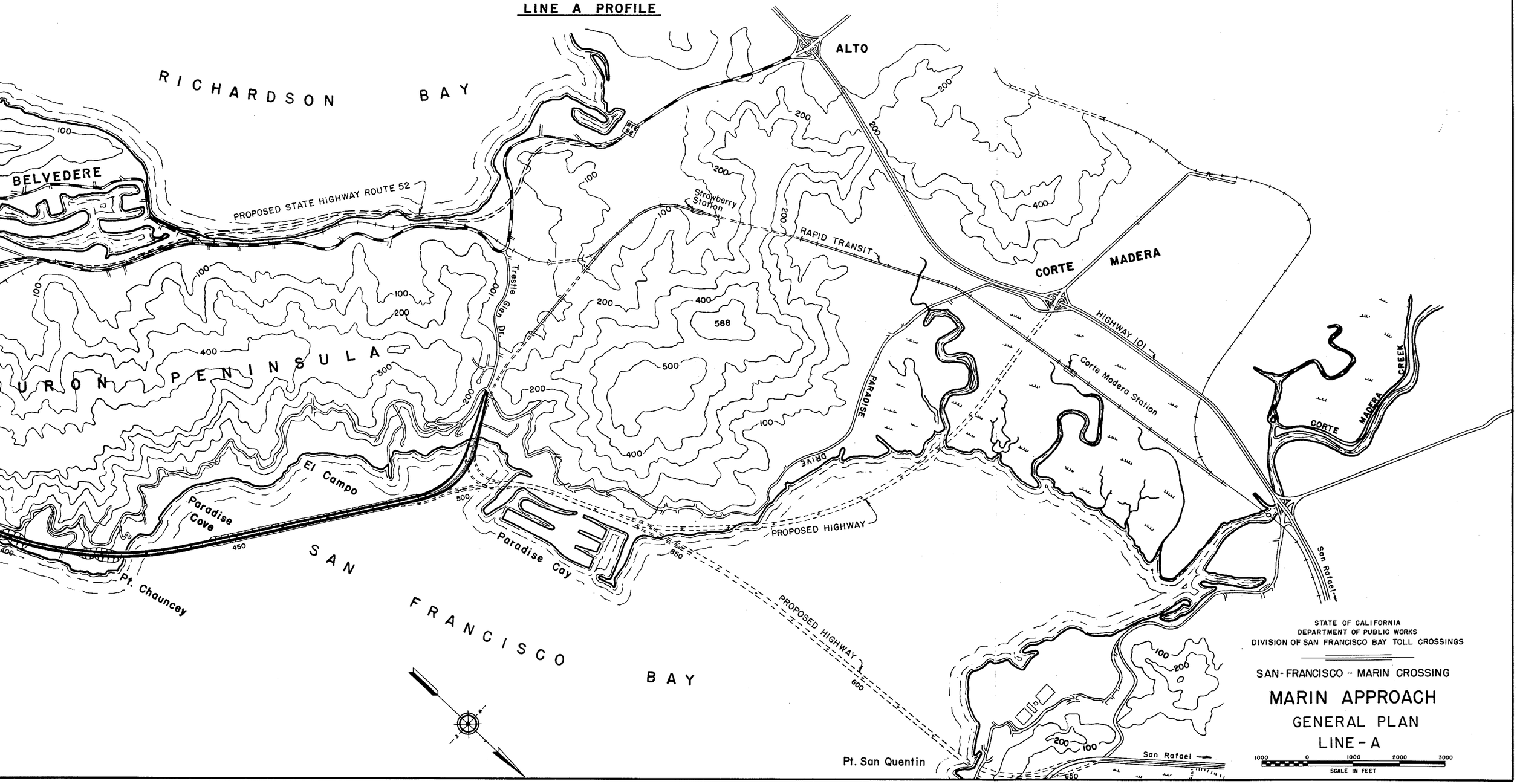




CORTE MADERA HIGHWAY PROFILE



LINE A PROFILE



STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

SAN-FRANCISCO - MARIN CROSSING

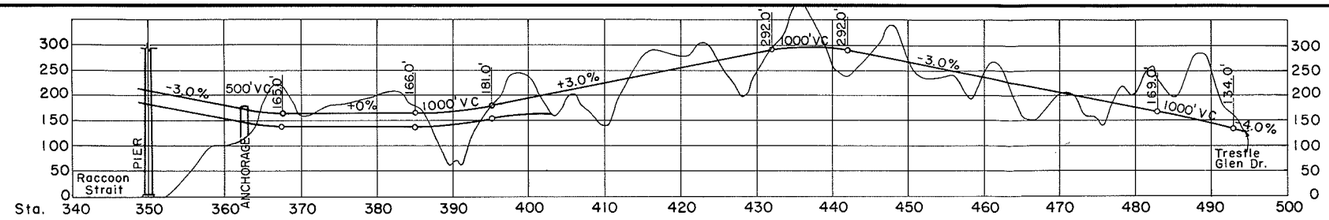
MARIN APPROACH

GENERAL PLAN

LINE - A

1000 0 1000 2000 3000
SCALE IN FEET

3001-



LINE B PROFILE

RICHARDSON BAY

ALTO

BELVEDERE

PROPOSED STATE HIGHWAY ROUTE 52

Strawberry Station

RAPID TRANSIT

Trestle Glen Dr.

SAN FRANCISCO-MARIN CROSSING

San Francisco

TIBURON

RACCOON STRAIT

TIBURON PENINSULA

PARADISE DRIVE

El Campo

Paradise Cove

Paradise Cay

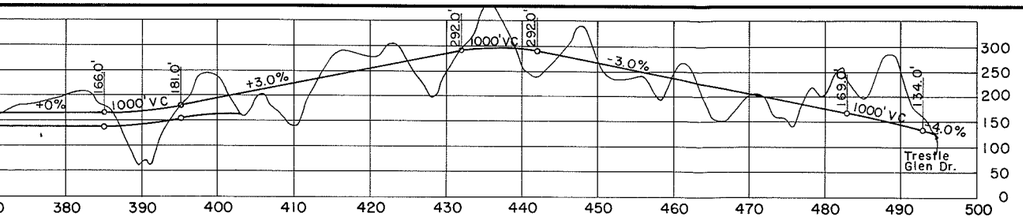
Bluff Pt.

Pt. Chauncey

SAN FRANCISCO BAY

Pt. San Quentin

FIG. IV-6



LINE B PROFILE

RICHARDSON BAY

BELVEDERE

PROPOSED STATE HIGHWAY ROUTE 52

Trestle Glen Dr.

Strawberry Station

RAPID TRANSIT

ALTO

CORTE MADERA

HIGHWAY 101

Corte Madera Station

CORTE MADERA CREEK

PARADISE DRIVE

RON PENINSULA

El Campo

Paradise Cove

Paradise Cay

Pt. Chauncey

SAN FRANCISCO BAY

Pt. San Quentin

San Rafael

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

SAN FRANCISCO - MARIN CROSSING

MARIN APPROACH
GENERAL PLAN
LINE - B

1000 0 1000 2000 3000
SCALE IN FEET

protected water area behind the fill. Also shown on Figure No. IV-5 are extensions of this approach to connect with U.S. 101 at Corte Madera and State Highway Route 69 at Point San Quentin. These extensions would provide a more direct access to this bridge and an alternate freeway route to San Francisco for traffic originating at Corte Madera, San Rafael, and other communities farther to the north.

Figure No. IV-6 shows the Marin Approach for Line B which traverses the western slope of Tiburon Peninsula to Trestle Glen Drive. At this point traffic would be routed via State Highway Route 52 to a connection with U.S. 101 at the Alto Junction. A connection is also provided at the southerly end of the Peninsula to serve local traffic to Belvedere, Tiburon and Hilarita. It would be possible to construct extensions to the north similar to those described for Line A.

ANGEL ISLAND CROSSING

The statute specifies that the proposed crossing must land upon Angel Island, the largest island in San Francisco Bay. It has an area of approximately one square mile and its highest point, Mt. Ida, is 781 feet above sea level. The Island is three and one-half miles from San Francisco and is separated from Tiburon Peninsula by Raccoon Strait. Angel Island has been under the control of the Federal government since 1850. At present the Federal installations have been largely deactivated with only standby personnel remaining.

The area around Hospital Cove on the northerly shores has been set aside as Angel Island State Park.

The administration and maintenance buildings, including the toll collection facilities, would be constructed on Angel Island. Locating this administrative complex on the Island would minimize right of way costs.

A preliminary layout for a toll plaza on the east side of the Island for Line A is shown on Figure No. IV-7 and Figure No. IV-8 depicts such an installation for Line B which would be on the west side. On- and off-ramps would be provided in both directions to serve the Island. If both decks of the bridge were to be utilized for highway traffic, a double-decked toll plaza could be considered.

TRANSBAY SECTION

The general plan and elevation of Line A is shown on Figure No. IV-9. This line crosses the Bay from Harbor Pier 37 in the City of San Francisco to Blunt Point on Angel Island. The crossing of Raccoon Strait connects Point Campbell on the Island and Bluff Point on Tiburon Peninsula.

The structure across the Bay between the City and Angel Island would be similar in appearance to that of the West Bay Crossing of the San Francisco-Oakland Bay Bridge and would have a length of approximately three and one-half miles. Commencing at the San Francisco shoreline the bridge would consist of two identical suspension spans separated by a center anchorage pier.

FIG. IV-7

Spans

Angel Island Crossing

Raccoon Strait Span

Datum M.L.L.W. = 0

ELEVATION

BAY

RANCISCO

650
600
550
500
450
400
350
300
250
50

PT. CAMPBELL

TO MARIN

RACCOON STRAIT

PT. SIMPTON

QUARRY PT.

PLAN

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

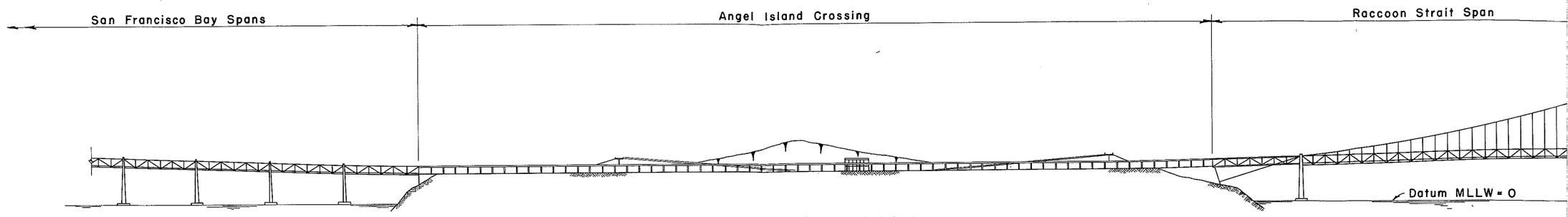
SAN FRANCISCO - MARIN CROSSING

ANGEL ISLAND-TOLL PLAZA

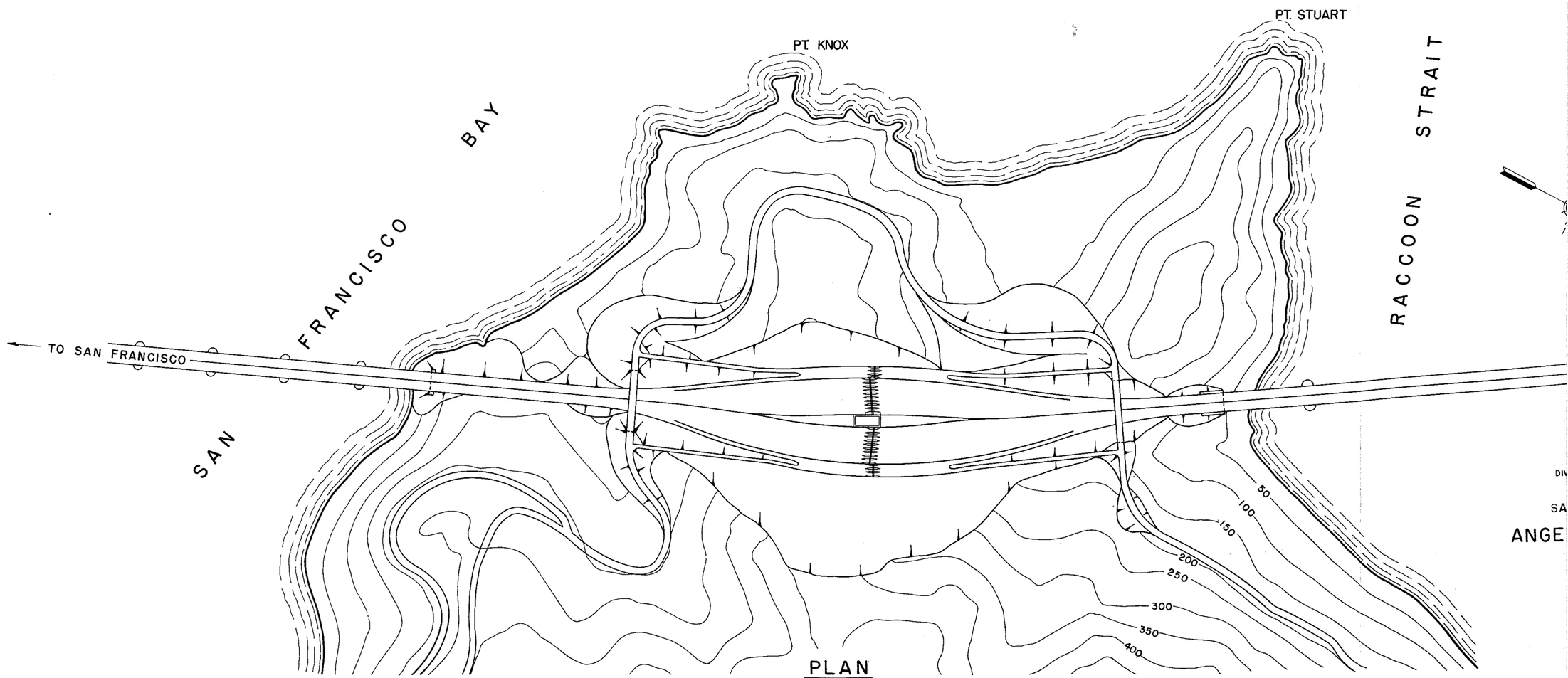
PLAN AND ELEVATION

LINE - A

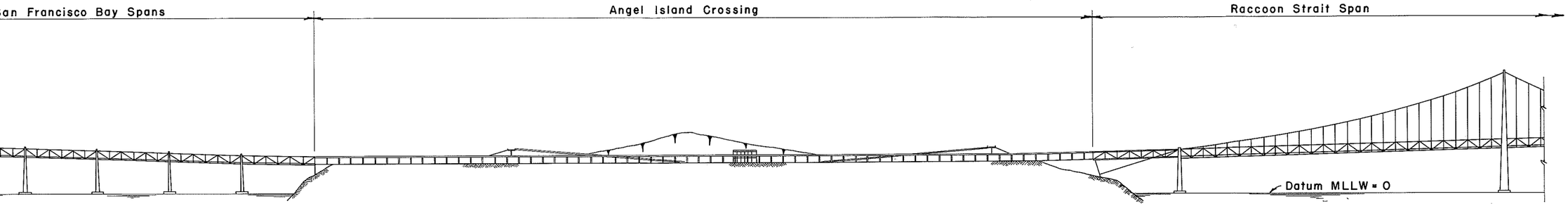
100 0 100 200 300 400 500
SCALE IN FEET



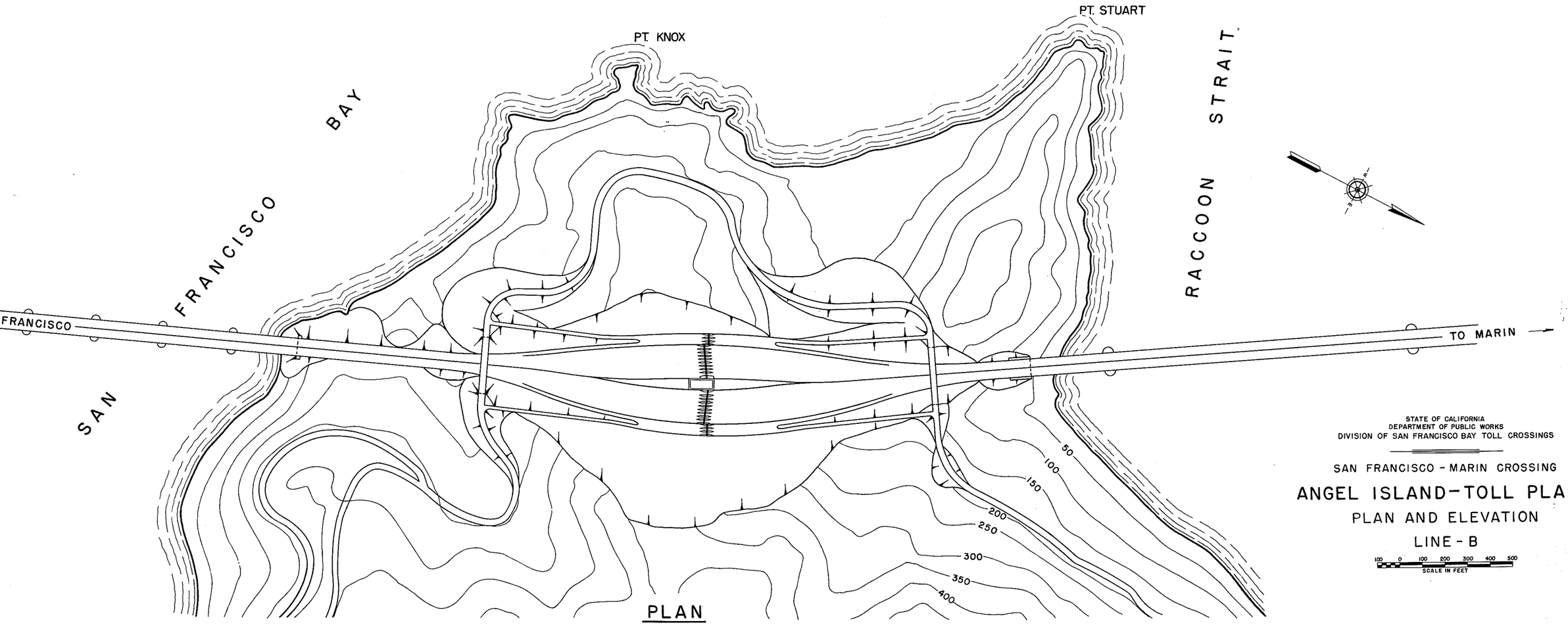
ELEVATION



PLAN



ELEVATION



PLAN

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

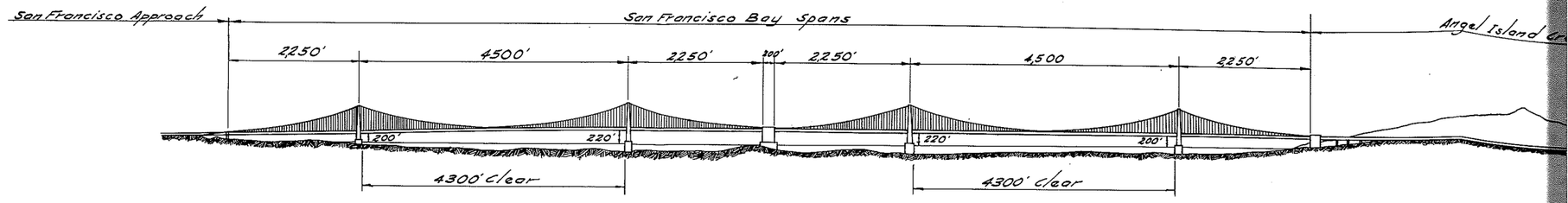
SAN FRANCISCO - MARIN CROSSING

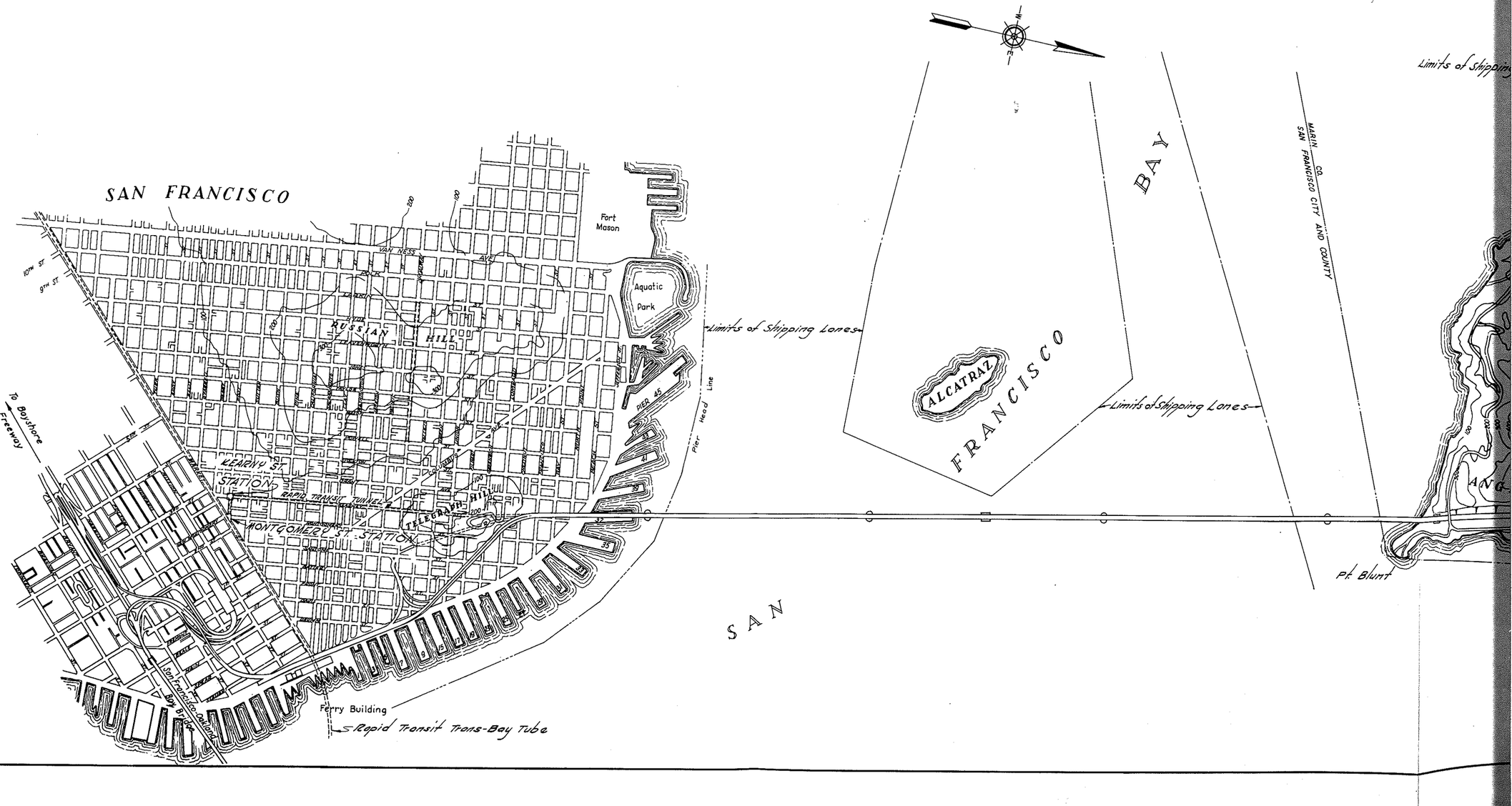
ANGEL ISLAND-TOLL PLAZA

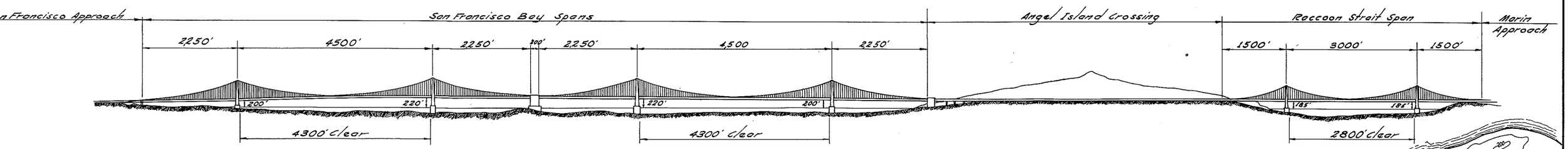
PLAN AND ELEVATION

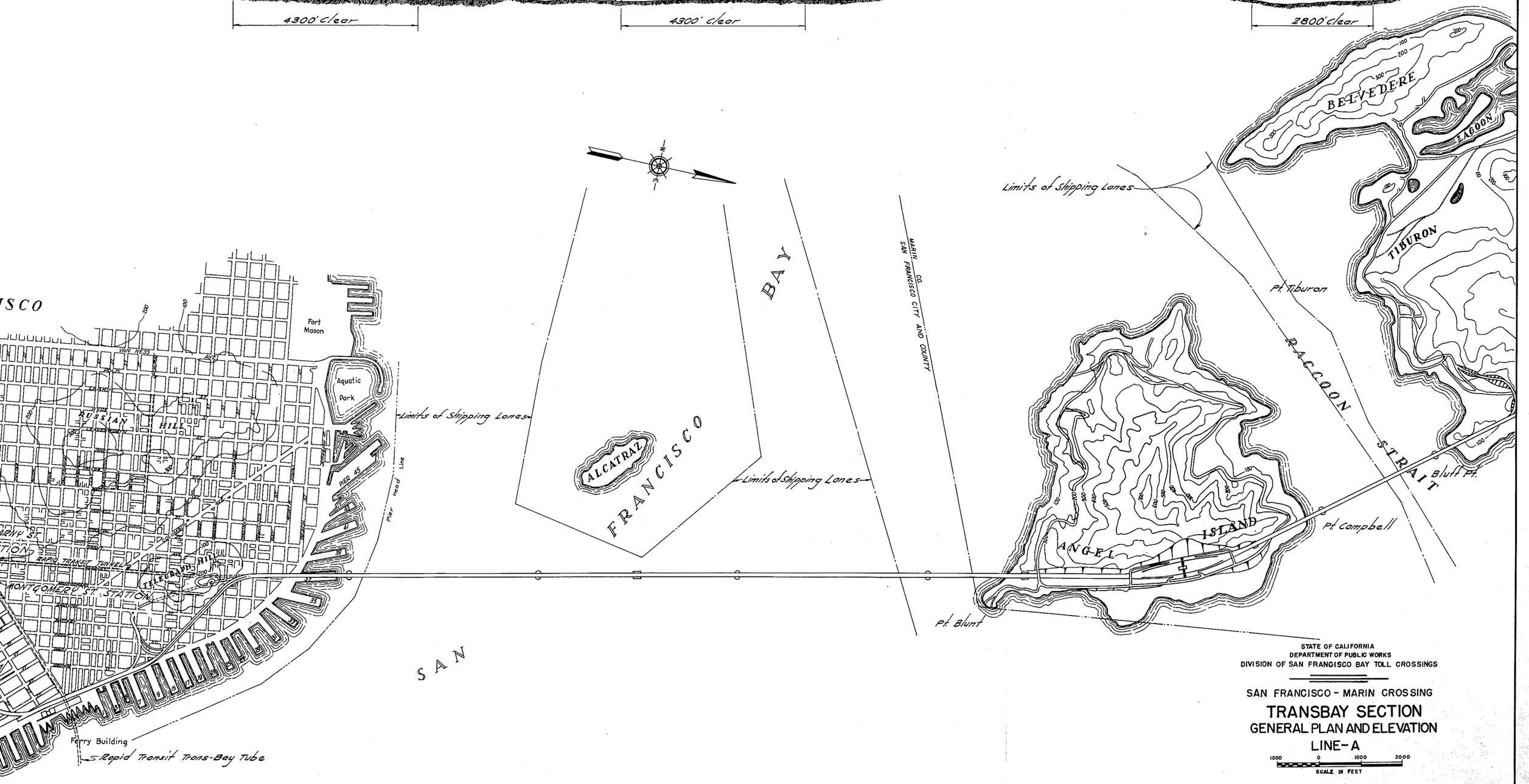
LINE - B

100 0 100 200 300 400 500
SCALE IN FEET


San Francisco Approach
San Francisco Bay Spans
Angel Island
2250'
4500'
2250'
200'
2250'
4,500
2250'
200'
220'
220'
200'
4300' clear
4300' clear


SAN FRANCISCO
Fort Mason
Aquatic Park
RUSSIAN HILL
NOB HILL
TELEGRAPH HILL
KEARNY ST. STATION
MONTGOMERY ST. STATION
RAPID TRANSIT TUNNEL
To Boyshore Freeway
Pier Head Line
PIER 45
Ferry Building
S.F.-Oakland Bay Bridge
S. Rapid Transit Trans-Bay Tube
Limits of Shipping Lanes
Limits of Shipping Lanes
Limits of Shipping Lanes
ALCATRAZ
SAN FRANCISCO BAY
MARIN CO.
SAN FRANCISCO CITY AND COUNTY
Pt. Blunt





STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

SAN FRANCISCO - MARIN CROSSING

TRANSBAY SECTION
GENERAL PLAN AND ELEVATION
LINE-A

1000 0 1000 2000
SCALE IN FEET

A series of simple truss spans would be built near the shore of Angel Island. The suspension bridges would have a main span of 4,500 feet, center to center of towers, and side spans of 2,250 feet. Minimum vertical clearance above mean higher high water (M.H.H.W.) would be 200 feet and would occur at the towers adjacent to the San Francisco and Angel Island shores. Maximum clearance at the towers near the center anchorage would be 220 feet. The horizontal clearance would be 4,300 feet between fenders of the main spans.

A 6,000-foot suspension bridge would be required over Raccoon Strait for Line A. It would have a main span length of 3,000 feet and side spans of 1,500 feet. The navigation channel in Raccoon Strait would have a horizontal clearance of 2,800 feet and a vertical clearance at the towers of 185 feet above mean higher high water. This vertical clearance is the same as that provided for the west channel of the Richmond-San Rafael Bridge.

Figure No. IV-10 shows the general plan and elevation for Line B. This line passes over Harbor Pier 39 and crosses the Bay to the west side of Angel Island and thence to Tiburon Peninsula in the vicinity of Point Tiburon.

Except for slightly shorter spans the structure for this line would be similar to that described for Line A. The main spans would have a length of 4,400 feet and side spans of 2,200 feet. The center anchor pier for this crossing would lie in the restricted waters around Alcatraz Island. The

horizontal clearances beneath the main spans would be 4,200 feet and the vertical clearances would be the same as that described for Line A.

For Line B a 5,400-foot suspension bridge would be required over Raccoon Strait. The main span would have a length of 2,700 feet, center to center of towers, and the side spans would be 1,350 feet long. The navigation channel beneath this bridge would be 2,500 feet wide and the vertical clearance would be similar to that described for Line A.

TRAFFIC LANE ARRANGEMENT

Preliminary plans of roadway arrangements for the over-water portions of the project must take into consideration the following:

1. The minimum number of lanes that would provide the required revenue at the lowest capital cost.

2. Provision for rapid transit facilities.

3. Flexibility to allow for increasing capacity at a future date.

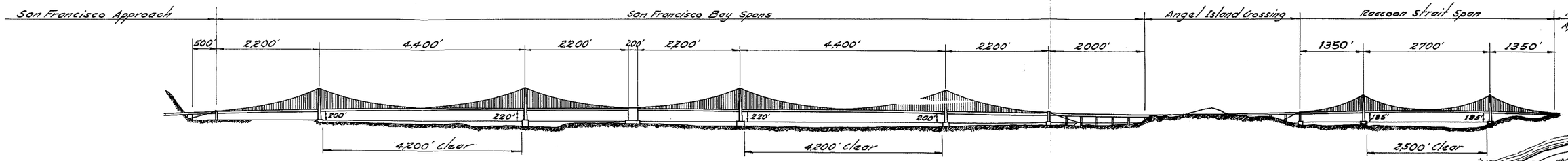
Possible lane arrangements are shown on Figure No. IV-12.

Plan 1 provides for six lanes of traffic on the upper level, three in each direction.

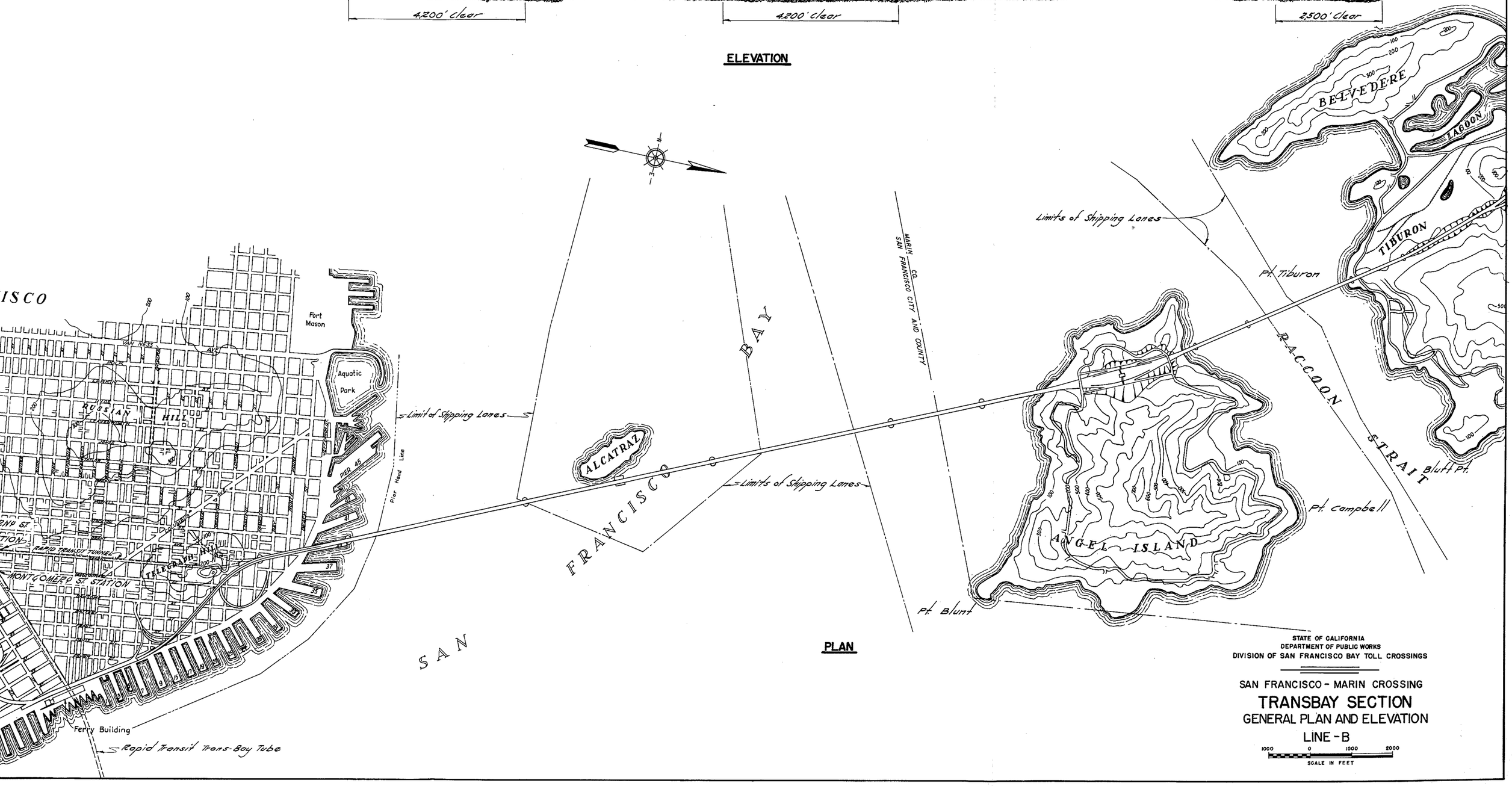
Plan 2 provides for two tracks on the lower deck for rapid transit.

Plan 3 is the same as Plan 2 but with the addition of four vehicular lanes, two in each direction, on the lower deck.

Plan 4 provides for six lanes of unidirectional traffic on each deck in the event rapid transit is not developed.



ELEVATION



PLAN

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

SAN FRANCISCO - MARIN CROSSING

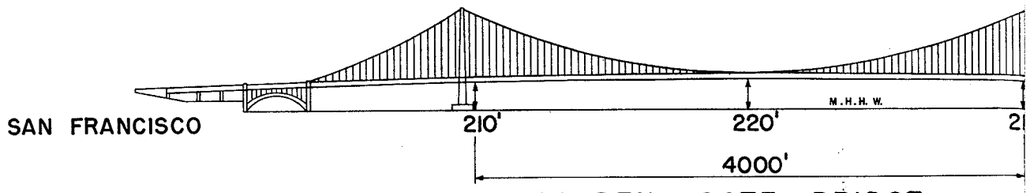
TRANSBAY SECTION

GENERAL PLAN AND ELEVATION

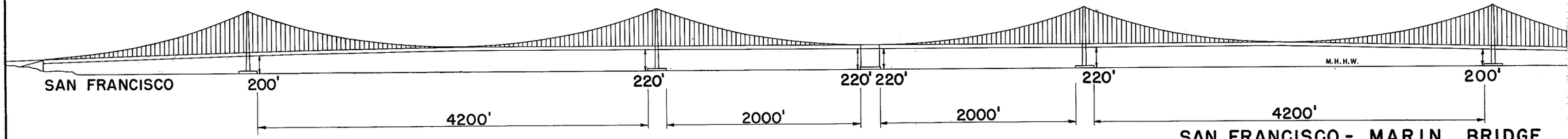
LINE - B

1000 0 1000 2000

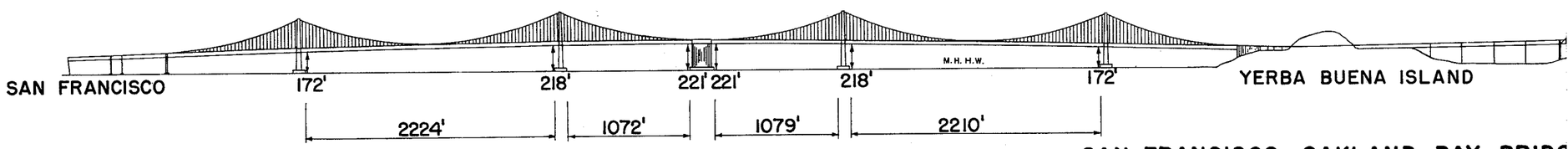
SCALE IN FEET



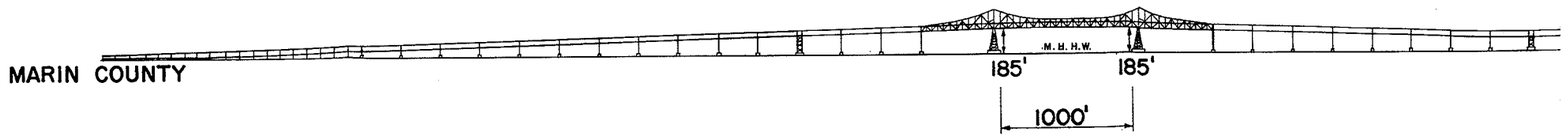
GOLDEN GATE BRIDGE



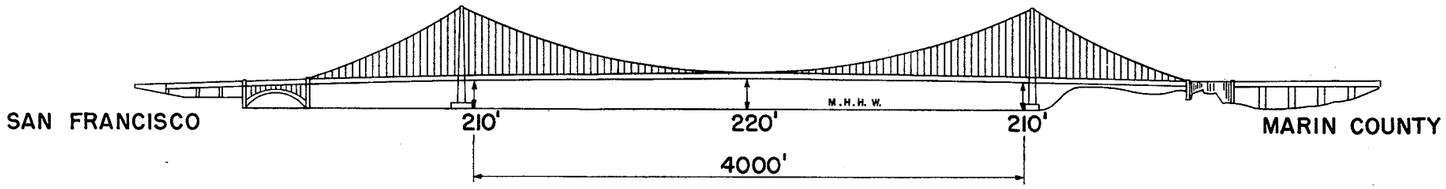
SAN FRANCISCO - MARIN BRIDGE



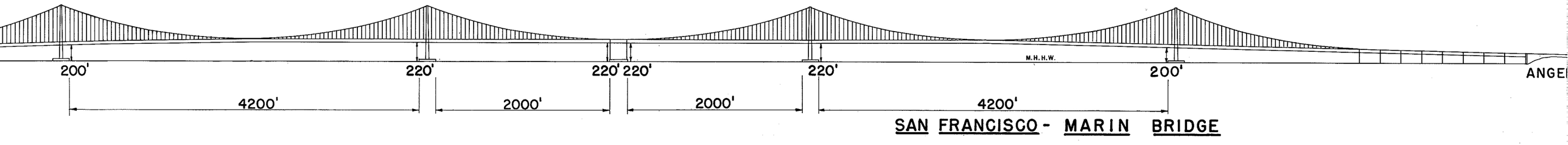
SAN FRANCISCO - OAKLAND BAY BRIDG



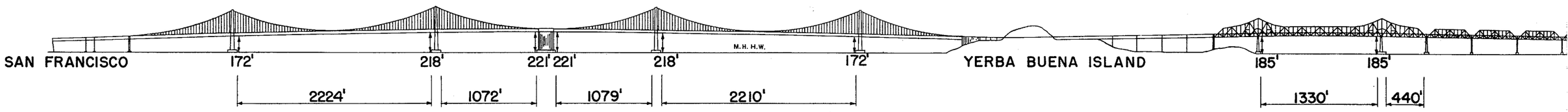
RICHMOND - SAN RAFAEL BRIDGE



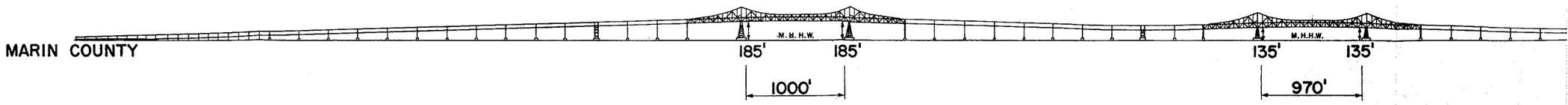
GOLDEN GATE BRIDGE



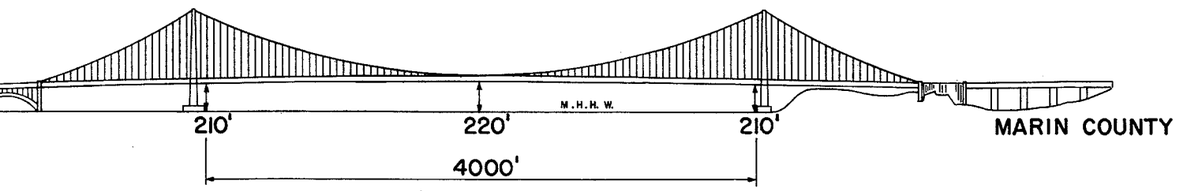
SAN FRANCISCO - MARIN BRIDGE



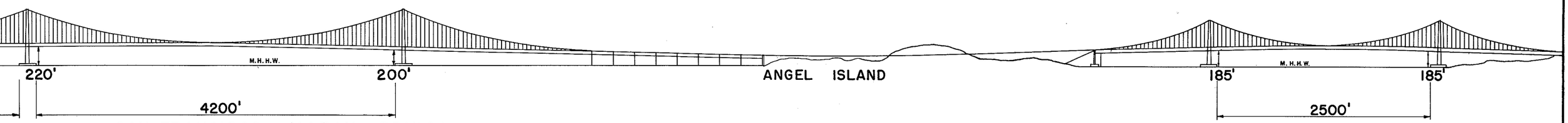
SAN FRANCISCO - OAKLAND BAY BRIDGE



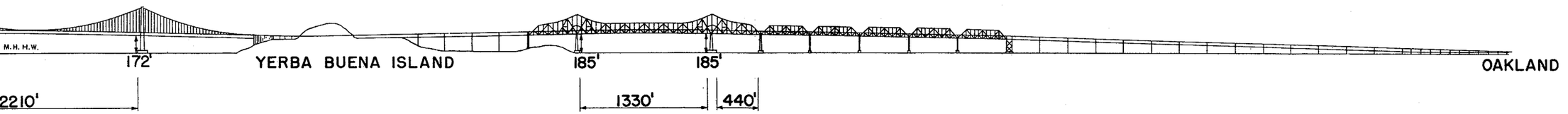
RICHMOND - SAN RAFAEL BRIDGE



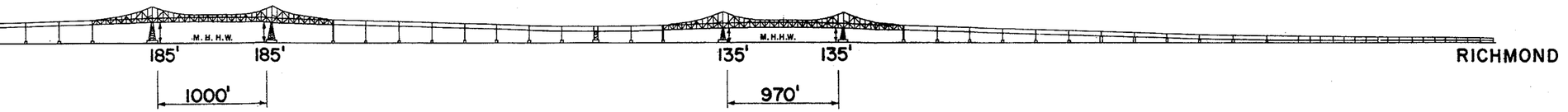
GOLDEN GATE BRIDGE



SAN FRANCISCO - MARIN BRIDGE



SAN FRANCISCO - OAKLAND BAY BRIDGE



RICHMOND - SAN RAFAEL BRIDGE

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS

SAN FRANCISCO - MARIN CROSSING

NAVIGATION CLEARANCES OF BAY BRIDGES

0 500 1000 1500
SCALE IN FEET

FIG. IV-12

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SAN FRANCISCO BAY TOLL CROSSINGS
SAN FRANCISCO — MARIN CROSSING
SUPERSTRUCTURE
CROSS SECTIONS
6 LANES (ONE WAY)
6 LANES (ONE WAY)
PLAN 4
MAXIMUM HIGHWAY PLAN
12 Lane roadway.
Outer separation.
2 Deck operation.
5'-0"
36'-0"
3 LANES
66'-0"
1'-0"
36'-0"
3 LANES
5'-0"
PLAN 1
MINIMUM HIGHWAY PLAN
6 Lanes divided roadway.
1 Deck operation.
3 LANES
2 LANES
RAPID TRANSIT
2 LANES
3 LANES
PLAN 3
MAXIMUM HIGHWAY PLAN WITH RAPID TRANSIT
10 Lanes divided roadway.
2 Rapid transit tracks.
2 Deck operation.
3 LANES
RAPID TRANSIT
3 LANES
PLAN 2
MINIMUM HIGHWAY PLAN WITH RAPID TRANSIT
6 Lanes divided roadway.
2 Rapid transit tracks.
2 Deck operation.

C H A P T E R VII

T R A F F I C A N D R E V E N U E

It is assumed, as will be explained in the following chapter, that the only funds available to repay the bonded indebtedness and the operating costs will come from the revenues derived from this project. To determine the amount of revenues available for these purposes it will be necessary to make a detailed analysis of the traffic which could be expected to use this crossing.

As a step towards gathering a portion of the required information an origin and destination traffic survey was conducted on the Golden Gate Bridge and on each of the State-owned toll bridges in the Bay Area. The survey was made during the months of October and November 1961, each survey continuing for 24 hours for the five day period Thursday through Monday. The data obtained from this survey, is at the date of this report, being processed in order to determine

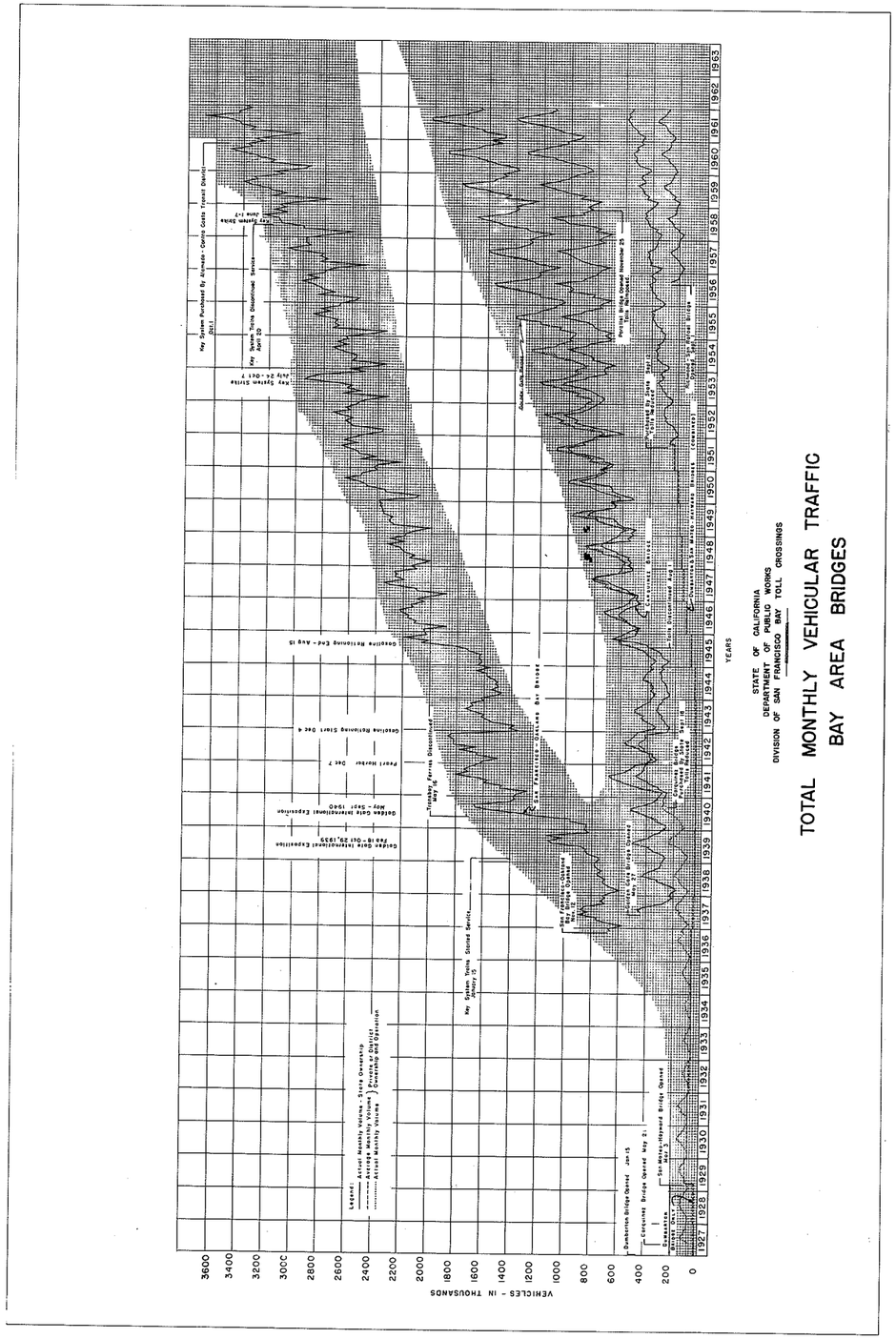
1. The amount of revenues that would accrue to this crossing, and

2. The amount of traffic that would be diverted from existing crossings and induced to use this additional crossing between San Francisco and Marin Counties.

BACKGROUND INFORMATION

Although there has not been sufficient time since the effective date of the enabling legislation to present a detailed discussion on traffic and revenue, there are certain facts available which can be enumerated for this progress report.

FIG. VII-1



Traffic

This crossing will be competitive with the existing toll facilities in the immediate vicinity for vehicular traffic to the counties north of San Francisco. Figuré No. VII-1 shows the total monthly traffic on all of the bridges in the Bay Area. During the period 1950 to 1961, inclusive, the volume of traffic on the Golden Gate Bridge has more than doubled, in 1950 the average daily traffic was 26,189 vehicles and in 1961 this had increased to 56,718 vehicles.

The Division's Report of January 1957 stated as follows:

"If this present trend should continue at the same rate, congestion on the bridge would soon be reached. A conservative projection of these figures indicates that an additional crossing between San Francisco and Marin County would be needed within the next seven to ten years."

Based upon the data accumulated to date the foregoing statement is still valid and another crossing is needed.

Revenue

The feasibility of financing this project will be based upon whether there are sufficient revenues to service the debt. The principal source of revenues comes from the collection of tolls from the users of the bridge. Thus, any new crossing between San Francisco and Marin Counties will be competitive with the other bridges in the immediate vicinity.

Rapid Transit Facilities

In arriving at the volume of vehicular traffic that may use this structure, and the resulting revenues, consideration

must be given to the possibility of a rapid transit system extending into Marin County. Therefore any analysis of traffic and revenue for this project must consider the following:

1. The effect a rapid transit system to Marin County would have on the volume of vehicular traffic between San Francisco and the aforesaid county if such a facility were constructed on the Golden Gate Bridge.

2. The effect a rapid transit system would have on the volume of vehicular traffic between San Francisco and Marin Counties if such a facility were constructed on a San Francisco-Marin County crossing as authorized under Chapter 2142, Statutes of 1961.

3. The effect on the volume of vehicular traffic if no rapid transit facilities were constructed between San Francisco and Marin Counties.

The Bay Area Rapid Transit District requested the occupancy of the lower level of the Golden Gate Bridge for their interurban passenger trains crossing the Bay.

Separate reports on the adequacy of the structure to accommodate trains were prepared by two independent engineering firms. After due consideration and review of the reports, the Directors of the Golden Gate Bridge and Highway District at their meeting of September 4, 1961, denied the request of the Transit District.

The engineering reports are now being reviewed by a three-man engineering board. They will report back to the Bridge District as to their findings regarding the desirability of placing trains on the Bridge.

The Statute requires the Department to investigate and study the feasibility of the financing and construction of rapid transit facilities in connection with this report and to cooperate and exchange information with the Transit District.

Pending the conclusions of the engineering board and the action that may be taken after submission of their findings, this report is including rail facilities on the San Francisco-Marin crossing.

Discussions with the Transit District with respect to the possible occupancy of a portion of this structure for rail service indicated the following:

1. The five-mile structure would probably require reduced train speeds resulting in increased crossing time.

2. The proposed location is not the most favorable for passenger potentialities both in lower Marin County and in San Francisco.

3. If the crossing on the Golden Gate Bridge is found feasible, this would be the Transit District's most likely selection.

4. If the accommodation of rail facilities on the Golden Gate Bridge is not permissible, it is believed the district will seek other means of providing transit service to Marin County.

The present crossing plans have provided for a double-track facility on the lower level with provisions for two 24-foot vehicular roadways, one on either side. The estimated cost of installing two tracks and the additional strengthening of the structure to carry rail traffic will be given in the

final report. Provisions will be made for six vehicular lanes on the upper level, three in each direction.

In the event rail facilities are not required and the lower level is needed for highway transportation, the Bridge can be converted to six lanes of unidirectional traffic on each deck.

CHAPTER VIII

FINANCIAL FEASIBILITY

Chapter 2142, Statutes of 1961 authorizing completion of the studies for a crossing between the City and County of San Francisco and Marin County specified that reports be made on

1. The feasibility of financing a toll bridge, toll tube, or toll highway, and

2. The feasibility of financing rapid transit facilities on the foregoing.

Under the Toll Bridge Authority Act there are two methods available to the Authority for raising funds to finance construction of its projects. They are as follows:

1. Section 30008 permits the State to make appropriations to aid the construction of toll facilities as the Legislature deems necessary.

2. Section 30200 permits the Authority to issue toll revenue bonds which are repayable from the tolls and revenues collected from the bridge users.

The more usual practice of the Authority is to finance its construction through the issuance of toll revenue bonds. This method was used to finance either the construction of or the purchase of the six State-owned toll bridges in the San Francisco Bay Area.

Since the statutes are not specific and there is some question as to how much aid, if any, the Legislature would be willing to provide under Section 30008 to help finance this project, such a source of funds can not be considered at this time in determining its financial feasibility.

The revenue obligations of the Bay Area toll bridges under the jurisdiction of the California Toll Bridge Authority are shown in Table I.

TABLE I

REVENUE OBLIGATIONS

Bridges	Revenues Obligated To
San Francisco-Oakland, San Mateo-Hayward and Dumbarton	1. The accumulated tolls to July 1, 1961, are being used to finance reconstruction of the San Francisco-Oakland Bay Bridge. Cost estimate $35,000,000. 2. June 30, 1964 to pay for the improvements to the San Mateo-Hayward Bridge. Cost estimate $70,000,000. 3. Finance construction of a rapid transit tube between San Francisco and Oakland providing issuance of general obligation bonds by the Bay Area Rapid Transit District has been approved by November 30, 1963. Cost estimate $130,000,000. 4. Finance construction of a Southern Crossing if (3) is not consummated. Cost estimate unknown.
Richmond-San Rafael	1. Repay $62,000,000 Series A Toll Revenue Bonds. 2. Repay State School Land Fund loan of $4,750,000 made in accordance with Chapter 159, Statutes of 1955.
Carquinez and Benicia-Martinez	1. Repay $46,000,000 Series A and $34,000,000 Series B Toll Revenue Bonds.

Examination of the above table would indicate that there are no substantial surplus revenues of these existing facilities which could be made available for use on this project. Furthermore, existing law would require bonds issued for this project to be secured solely by the revenues thereof.

As the Golden Gate Bridge is not a State-owned facility the revenues have not been included.

CONCLUSIONS

It would appear from the foregoing therefore the only available means of financing this project would be the issuance of toll revenue bonds in accordance with Section 30200, et. seq., of the California Toll Bridge Authority Act.

C H A P T E R IX

L E G A L

STATE LEGISLATION

There may be need of additional legislation to clarify the present statutes and in the acquisition of certain lands and properties. Changes with respect to limiting distances between competing toll facilities, existing franchises and revenue bond covenants may be needed.

The extent of the responsibility of the Department of Public Works for financing and constructing rapid transit facilities for this project should be more clearly defined. Pending such clarification the rapid transit facilities to be provided for this project and to be considered in the cost estimate are assumed to consist of the fixed rail facilities between bridgeheads.

FEDERAL LEGISLATION

During the course of this study, it was found that certain lands, within the limits specified by Statute for the Crossing, are controlled by the Federal Government. Each of the alignments studied as possible Crossing routes would infringe in some manner upon this property.

Therefore, it appears that Federal legislation might be required to obtain certain rights.

APPENDIX A

Senate Bill No. 1273

CHAPTER 2142

An act providing for the investigation and study of the feasibility of financing and constructing a toll bridge, toll tube, or other toll highway crossing across San Francisco Bay from San Francisco to Marin County by way of Angel Island or Alcatraz Island, and the inclusion of rapid transit facilities thereon, including necessary surveys, plans, estimates of costs, and preliminary engineering, and making an appropriation therefor.

[Approved by Governor July 19, 1961. Filed with Secretary of State July 20, 1961.]

The people of the State of California do enact as follows:

SECTION 1. The Department of Public Works is hereby authorized and directed to complete the investigation and study conducted pursuant to Chapter 1845 of the Statutes of 1955 of the feasibility of financing and constructing, pursuant to the California Toll Bridge Authority Act, a toll bridge, toll tube, or other toll highway crossing across San Francisco Bay from a point between Battery and Stockton Streets in the City and County of San Francisco to a point on Angel Island and thence to Marin County. The department shall include in such investigation and study a comparison of an alternative route for such a crossing, via Alcatraz Island. The department shall also include in such investigation and study a review of all previous studies made by the state and federal governments of alternative routes for such a crossing on a salt water barrier connecting Marin County, Alameda County, and San Francisco, but no new studies shall be conducted as to such alternatives. In making such investigation and study, the department shall prepare such surveys, plans, and estimates of costs, and shall conduct such preliminary engineering, as may be necessary or convenient.

The department shall include in such investigation and study, an investigation and study as to the feasibility of the financing and construction of rapid transit facilities in connection with the toll bridge, tube, or other highway crossing. The department shall co-operate and exchange information with, make information available to, and consider any recommendations of, the San Francisco Bay Area Rapid Transit District with respect to such investigations and studies.

The department shall submit a progress report to the Legislature as to such investigation and study by the first calendar day of the 1962 Regular Session of the Legislature, and shall submit a final report thereon to the Legislature at the 1963 Regular Session of the Legislature not later than February 1, 1963.

SEC. 2. The sum of five hundred thousand dollars ($500,000), or so much thereof as may be necessary, is hereby appropriated out of the the money in the State Highway Fund available for construction of state highways in County Group No. 1, as specified in Section 187 of the Streets and Highways Code, to the Department of Public Works to carry out the investigation and study required by Section 1 of this act. The California Toll Bridge Authority shall return said appropriation, or so much thereof as may be used, together with interest thereon at the rate of one and one-half percent (1½%) per annum, to be computed on the total amount withdrawn during any one year, to the State Highway Fund in the State Treasury from the proceeds of the first sale of revenue bonds issued for the construction of any toll bridge, toll tube, or other toll highway crossing under the provisions of the California Toll Bridge Authority Act between the City and County of San Francisco and the County of Marin; provided, that in the event revenue bonds are not issued and sold for the construction thereof, any money expended from this appropriation shall be returned to the State Highway Fund from that portion of the San Francisco-Oakland Bay Bridge Toll Revenue Fund other than from the tolls of the existing San Francisco-Oakland Bay Bridge or of any other bridge or bridges which are deposited in said fund. The moneys required to be repaid by this section shall be credited to the money available for the construction of state highways in County Group No. 1, as specified in Section 187 of the Streets and Highways Code.